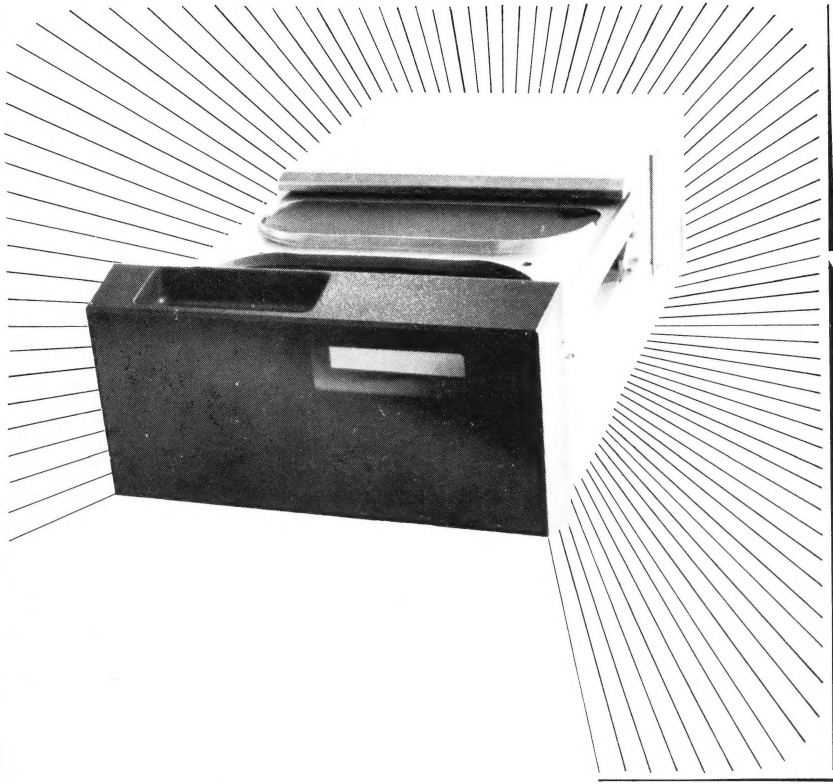
D140 Disk Drive family

Product Manual



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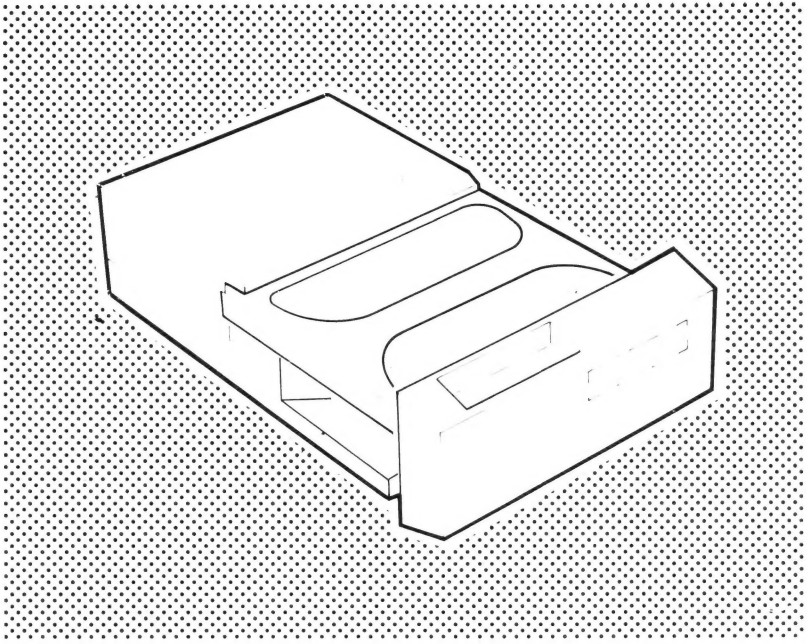

GENERAL INFORMATION

1

47240395.002

1.1 GENERAL DESCRIPTION

- The D140 disk drive is a removable and fixed disk, moving head unit of 20 Megabytes storage capacity.
- Read and write operations are effected by 4 moving heads which ride on a air cushion over the surface of the disks.
- Head displacement is effected by a voice coil linear motor.
- Head position is monitored by servo information recorded on each track at the beginning of each sector, intermixed with the recorded data blocks.
- The disks rotate at 3600 rpm, using a brushless D.C. motor with electronic commutation provided by 2 hall effect chips. The selected disk angular origin is indicated by an index mark timing pulse, obtained, each revolution, from a magnetic index transducer.
- Each track is electrically divided in equal length sectors. The beginning of each sector is indicated by a sector mark timing pulse obtained from the prerecorded information in the servo zone on the disk and read by the read head.
- The disk drive contains clock and data recovery circuits allowing data exchange at the interface in NRZ code. Data recording mode is MFM.
- The removable disk is contained in a rigid, lightweight, dustproof cartridge. The cartridge is front loaded into the disk drive.
- The fixed disk is clamped on the spindle, mechanically protected.
- Disk dust proofing is maintained, during operation, by a self generated filtered air circulation.
- Heads are loaded by ramp loading system and are locked in retract position.
- Do not unlatch the security hook of carriage.
- The disk drive connects to the host system through two interface cables (to the controller) and one power cable (to the power supply).

1.2 PHYSICAL DESCRIPTION

See Section 4.3 Figure 4.3.1 - 4.3.2 - 4.3.3

1.3 PHYSICAL CHARACTERISTICS (See Figure 1.1)

Size and weight :	Widht	: 311 mm	12.25 in
	Height	: 172.5 mm	6.79 in
	Depth	: 534.5 mm	21.04 in
	Weight	: 22 kg	48.4 lb

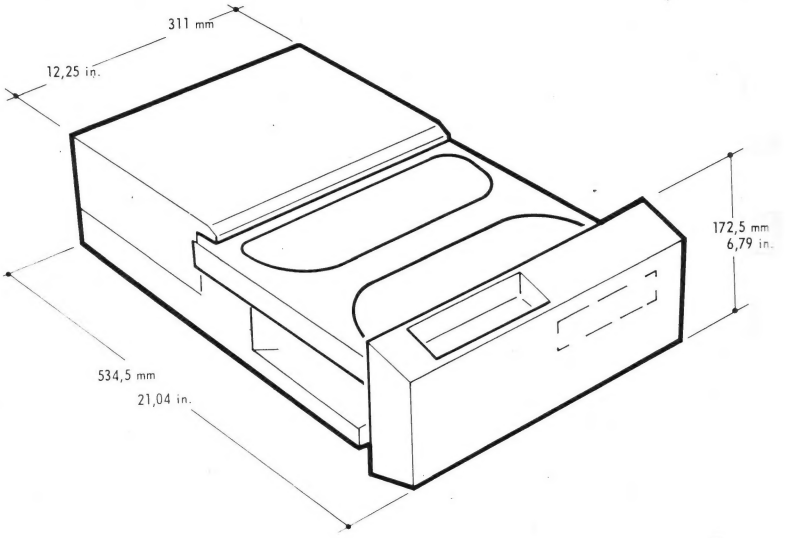

Figure 1.1

47240395-001

1.4 PERFORMANCE

- Access time

  - Average latency time : 8.3 millisecond
  - Head positionning
    - track to track 15 millisecond
    - average 65 millisecond

- Data storage capacity

  - The usable capacity is 20 Megabytes formatted data.

1.5 RECORDING PARAMETERS

D 140 / 142

Number of tracks per surface	392	
Number of sectors per track	50	
Data bytes per sector (formatted)	256	
Recording density	4750	BPI
Track density	508	TPI
Transfer rate	920	Kbytes/sec.
Disk rotation speed	3600	rpm.
Disk rotation time	16.7	millisecond.

D 141 / 143

Number of tracks per surface	392	
Number of sectors per track	42	
Data bytes per sector (formatted)	288	
Recording density	4750	BPI
Track density	508	TPI
Transfer rate	920	Kbytes/sec.
Disk rotation speed	3600	rpm.
Disk rotation time	16.7	millisecond.

1.6 ENVIRONMENT

- The drive can operate in a normal office environment without air conditioning. The main environment parameters are given below :
  - Temperature range - dry bulb : 15 °C to 40 °C (59 °F to 104 °F)
  - Temperature gradient/hour : 5 °C (9 °F)
  - Relative humidity : 8 % to 80 %
  - Humidity gradient/hour : 10
  - Atmospheric pressure range : 562 to 780 mmHg

1.7 POWER REQUIREMENTS

+ 35 VDC ± 10% — 15%	: 2.5 A. nominal	Motor	supply
	: 6.5 A. surge during 20 sec.		
— 12 VDC ± 5%	: 0.85 A. nominal	Analogic	Supplies
+ 12 VDC ± 5%	: 1.0 A. nominal		
+ 5 VDC ± 5%	: 4.4 A. nominal	Logic	supply

1.8 POWER CONSUMPTION

Average power consumption	: 130 W
During start up (20 seconds)	: 280 W

1.9 CARTRIDGE DESCRIPTION (See Figure 1.2)

The D 140 disk drive uses a M 4120 cartridge or any qualified cartridge allowing the same performance. The cartridge contains one industry standard disk of 10.5 in. diameter, oxide coated on both sides. The disk is pre-recorded with head servo data, track address, address parity and a defective sector flag, and is supplied ready for use.

Physical characteristics (Figure 1.3) :

- Width	283	mm	11.1 in.
- Depth	285	mm	11.22 in.
- Thickness	23	mm	0.9 in.
- Weight	1.3	kg	2.8 lb.

WARNING

The cartridge must be kept away from dust, grease, shocks, and abrasive or sharp objects. In addition, proximity of a significant magnetic field can erase recorded data and make the cartridge unfit for use.

Particular attention should be given to the cleanliness of the sliding door window, and of the circular opening.
The metallic disk must be kept away from any shock.

Do not handle it by another place that hand grip.

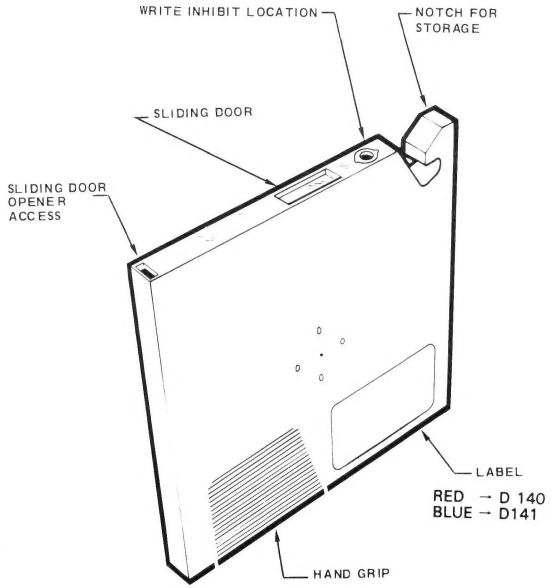

Figure 1.2

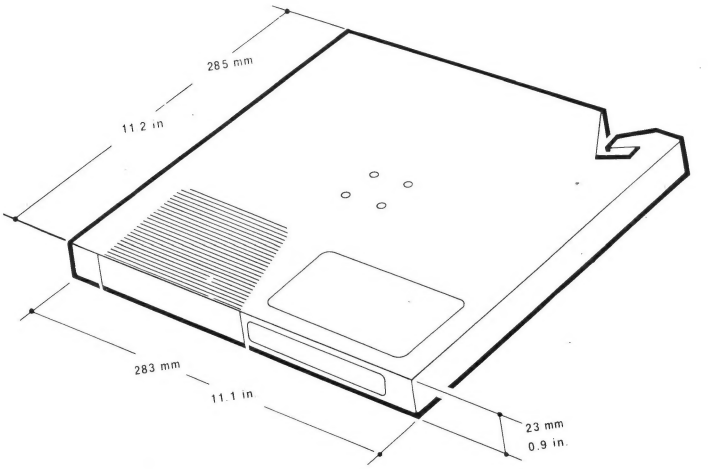

Figure 1.3

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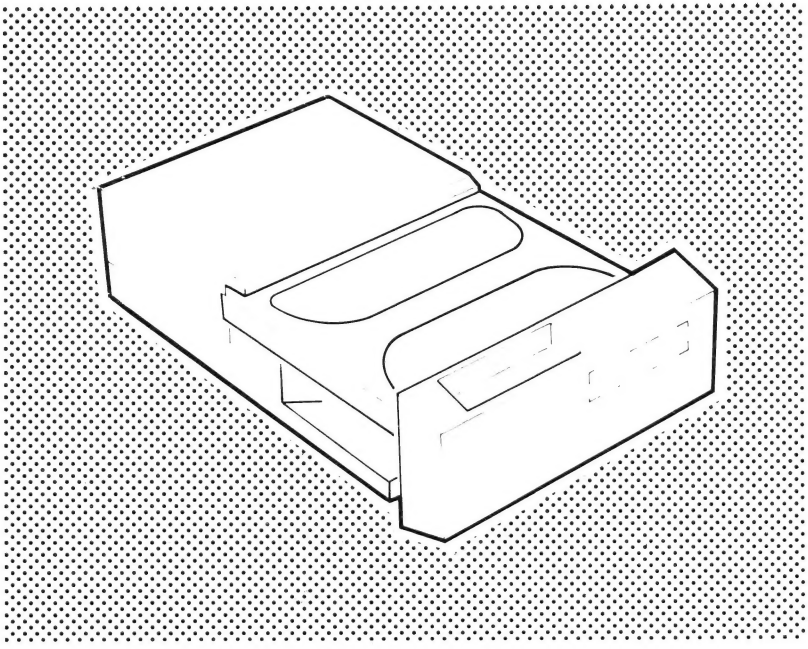
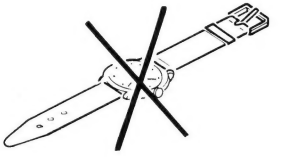


INSTALLATION 2

WARNING

Do not bring wrist watches near the voice coil magnet as they risk being damaged.



2.1 UNPACKING

— The drive unpacking is assumed to have been done according to the unpacking instruction sheet located in the pocket outside.

If external or internal damage is observed, tell the appropriate reserves to the transporter.

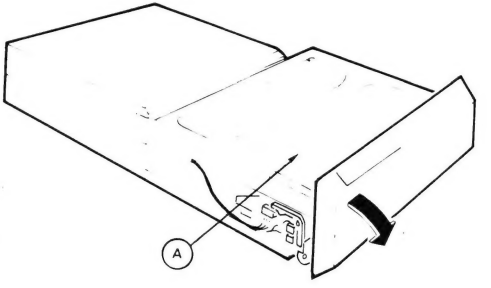


Figure 2.1

2.2 SHIPPING PART REMOVING

— Open the front door.

— Remove dummy cartridge A. (Figure 2.1.)

NOTE

Conserve the shipping part any for eventual use.
During transportation use dummy cartridge.

2.3 INSTALLATION

— Table top

— Rack :
The rack mounting model may be installed in a 19 inch standard rack.
It is possible to mount the drive either horizontally (Figure 2.2.a) or vertically (Figure 2.2.b).

(1) (2) (3) Fixing points for vertical mounting

(4) (5) (6) Fixing points for horizontal mounting

NOTE

The bracket 2 is supplied in a bag with the disk drive. Mounting as shown in ***figure 2.2.c.***

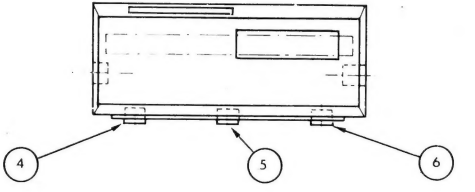


Figure 2.2.a

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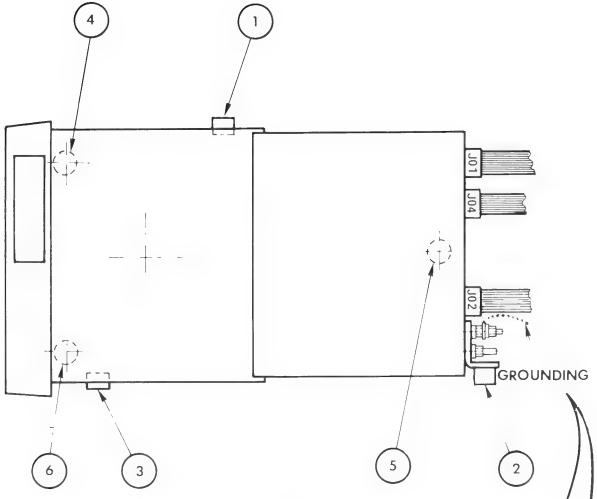

Figure 2-2.b

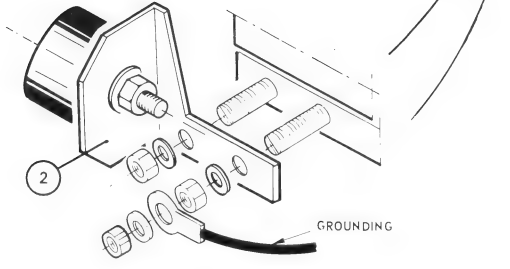

Figure 2.2.c

2.4 CONNECTION

2.4.1 D140

The disk drive connects through three cables (Figure 2.3):

— One power connector J02 (Grounding wire AWG 14).
— Two logic interface connectors J01 and J04.

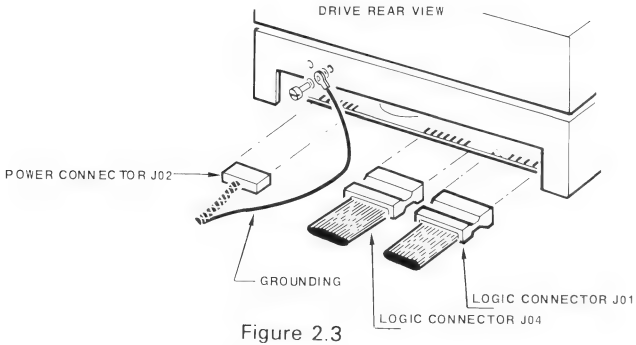

Figure 2.3

2.4.2 D141

The disk drive connects through three or four cables (Figure 2.4):

— One power connector J02 (Grounding wire AWG 14)
— Two or three logic interface cables *.

Radial cable → Connector JB

Daisy chained → Connectors J1A-J2A

* If the drive is the last in the chainning, connect the terminator (47234404-001) to J1A.

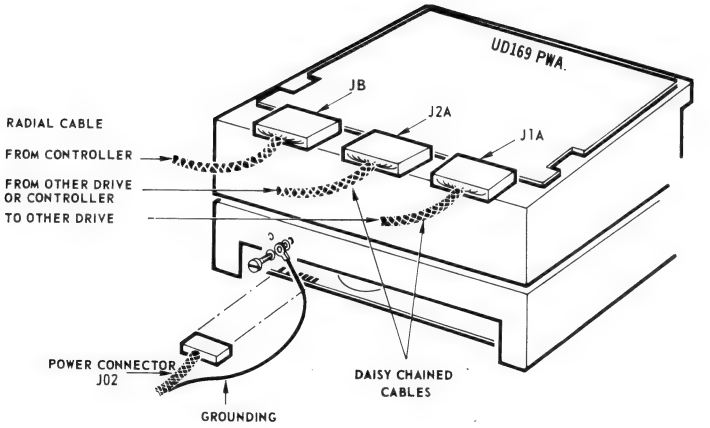

Figure 2.4

2.5 VISUAL INSPECTION

Front door locking : that the Front door is locked when the coil is de-energized (Only if a cartrige is loaded).

— Remove the top cover (2 screws).

Cables : no folds, not cut or broken, connectors fully plugged in.

Carriage : moves backward when opening the front door.
Moves forward when closing the front door.

Motor : rotate the motor by hand. It must turn freely.

Boards : check of any possible damage.

2.6 PRELIMINARY TEST

a) Set the drive POWER ON (refer to system manual).
b) Insure that the CARTRIDGE ACCESS is given by the system (refer to system manual).
c) Insert a cartridge (refer to section 3 "Operating Procedures").
d) Run the test according to the procedure detailed in the system manual.

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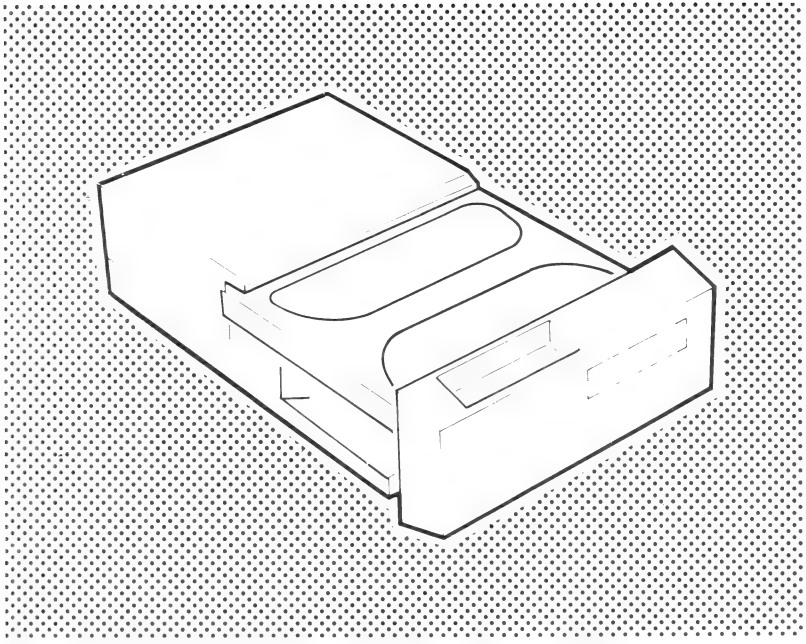

OPERATING PROCEDURES 3

3.1 GENERAL

No operator control or indicator exists on the disk drive, except the front door, the write protection tag on each cartridge and the write protection switch of fixed disk. Controls and indicators are located on the system, and are system specific (refer to system manual).

3.2 CARTRIDGE HANDLING

Cartridge must be handled carefully for both : operation on disk and storage.
Cartridge Description, see Section 1, Figure 1.2.

3.3 POWER UP/DOWN

No power command or indicator exists on the disk drive. Power is supplied either by the system, or by a separate power supply (refer to system manual). Note that the drive front panel cannot be opened if the drive is not powered up and if the cartridge is inside machine.

3.4 START THE DISK DRIVE

Use the start control or procedure defined at system level (refer to system manual).
Note that, once the start function has been initialized, it takes about 25 seconds for the disk drive to reach its READY state, after which data exchange can operate under the control of the processor.

3.5 STOP THE DISK DRIVE

Use the stop control or procedure defined at system level (refer to system manual).
Note that, once the stop function has been initialized data exchange with the processor is immediately interrupted and that it takes about 25 seconds for the disk drive to reach its steady state (disk no longer rotating).
This condition is mandatory for following access to the cartridge and is visible at system level.

WARNING

The cartridge must be kept away from dust, grease, shocks and abrasive or sharp objects. In addition, proximity of a significant magnetic field can erase recorded data and make the cartridge unfit for use.
Particular attention should be given to cleanliness of the cartridge, and to the circular window. The metallic disk must be kept away from any shock.

WARNING

In case, of power loss, the disk rotation cannot be braked and the stop function can take up to four minutes to be completed.
For that reason NEVER try to open the disk front panel if not authorized by the CARTRIDGE ACCESS function explained in par. 3.6.

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3.6 CARTRIDGE ACCESS

The possibility for the operator to access the cartridge is indicated by the system through a CARTRIDGE ACCESS indicator or procedure (refer to system manual).

When the CARTRIDGE ACCESS function is not present, the disk front door is mechanically locked and cannot be opened.

3.7 REMOVING THE CARTRIDGE

Check that the CARTRIDGE ACCESS function is fulfilled (refer to system manual).
Open the disk drive front door.
Pull out the cartridge by hand grip from its receptacle (Figure 3.1) and place it in a safe environment.

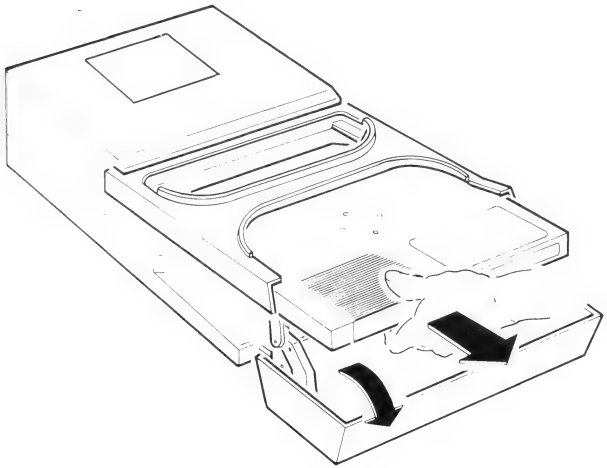


Figure 3.1

3.8 INSERTING THE CARTRIDGE

The disk drive front door is assumed open. If not, use the procedure described above.
Insert and push the cartridge into its receptacle.
The metal ring must be placed underneath (if drive in horizontal position) or at left. (If drive in vertical position).
The cartridge hook must be placed at the forward right corner (or forward bottom corner if drive in vertical position).
Close the door in order to complete cartridge insertion. (Figure 3.2).

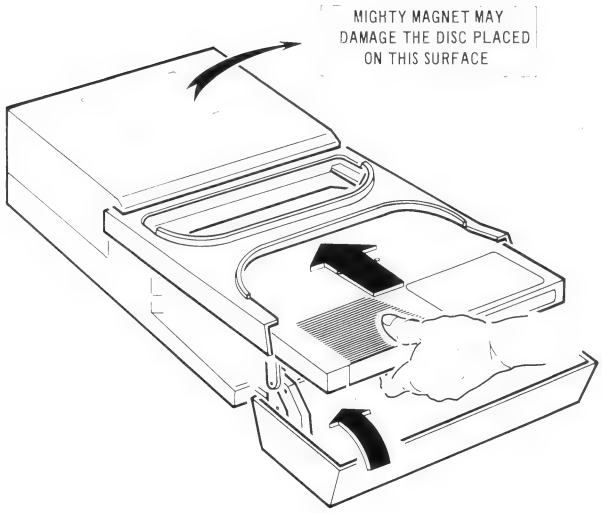


Figure 3.2

3.9 WRITE PROTECTION ON REMOVABLE DISK

If the write protection option is installed on the disk drive, it can be used, at cartridge level, as indicated Figure 3.3.

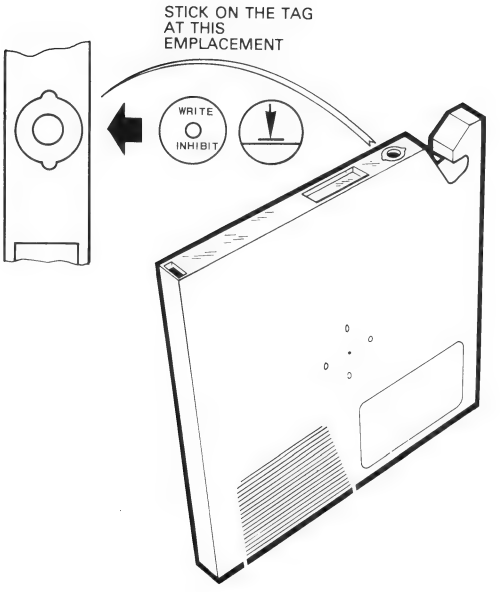


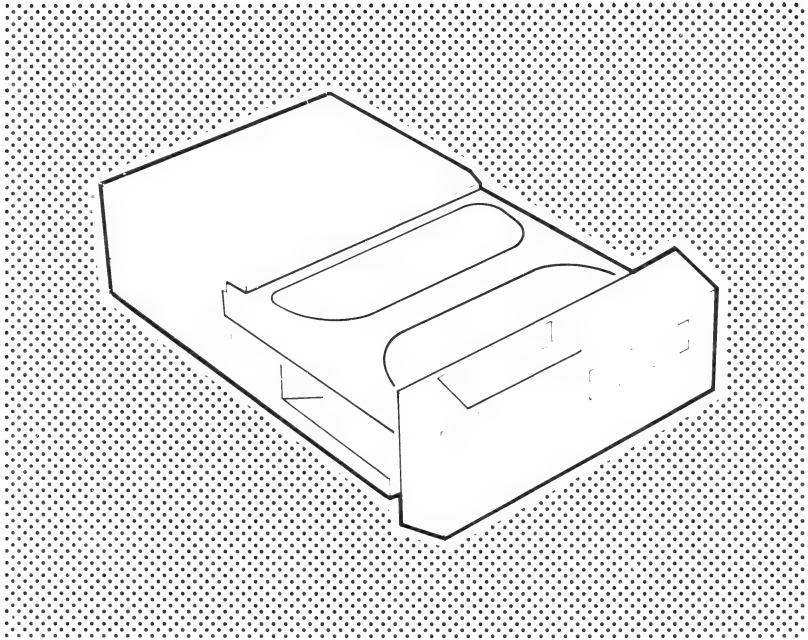
Figure 3.3

3.10 WRITE PROTECTION ON FIXED DISK

The fixed disk can be protected by the switch C located behind the front door (Figure 3.4).

Figure 3.4

47240395-001



FAULT DIAGNOSIS 4.1

Tools required : Multimeter

: Tool No. 47238239-001 V.D in ISK No.5

Definitions :

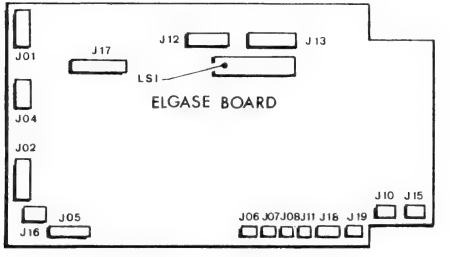
0L : 0 to 0.4V

1L : 2.8 to 5.25V

V.D : How to use it :

- connected it to J17 located in B3. See Figure 1
- the push button is used to switch-off the LED

Fig. 1



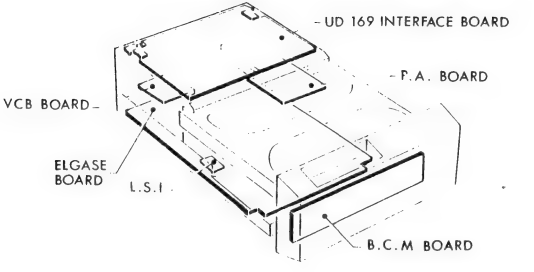


Fig. 2

Fault Definitions FLT : Device Fault

1. OFFSET : Carriage offset
2. WNWRT : Write and Write Protect
3. WRTRLS : Write and No Write transition
4. OVREAD : Read outside Data zone
5. WRTNRD : Write and Read
6. WCRNRD : Write current and Read
7. OVWRT : Write outside data zone
8. ONORDY : Read or Write operation and not ready
9. ZRPFLD : ZRP code failed
10. SNORDY : Seek and not ready
11. VLTFLT : Voltage supply, fault or speed too high
12. LONGSK : Too long seek

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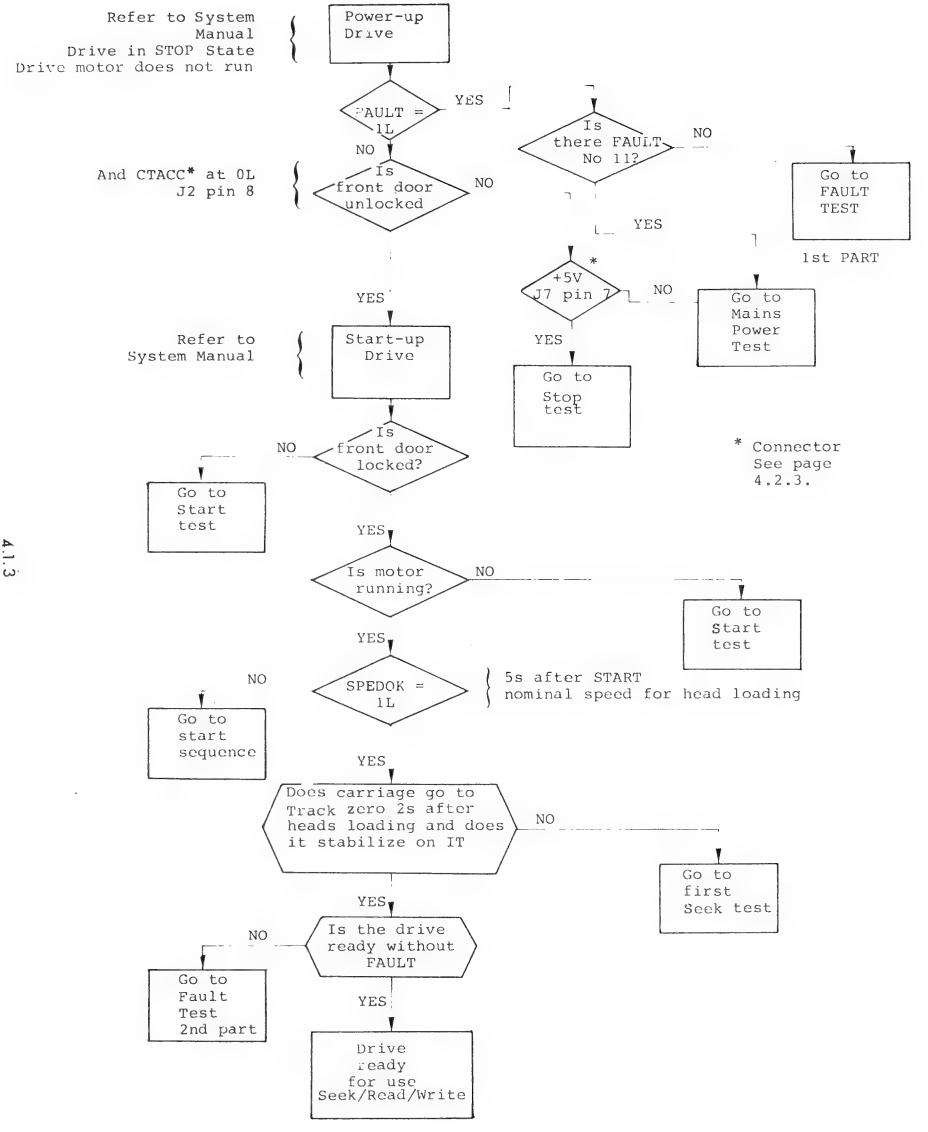
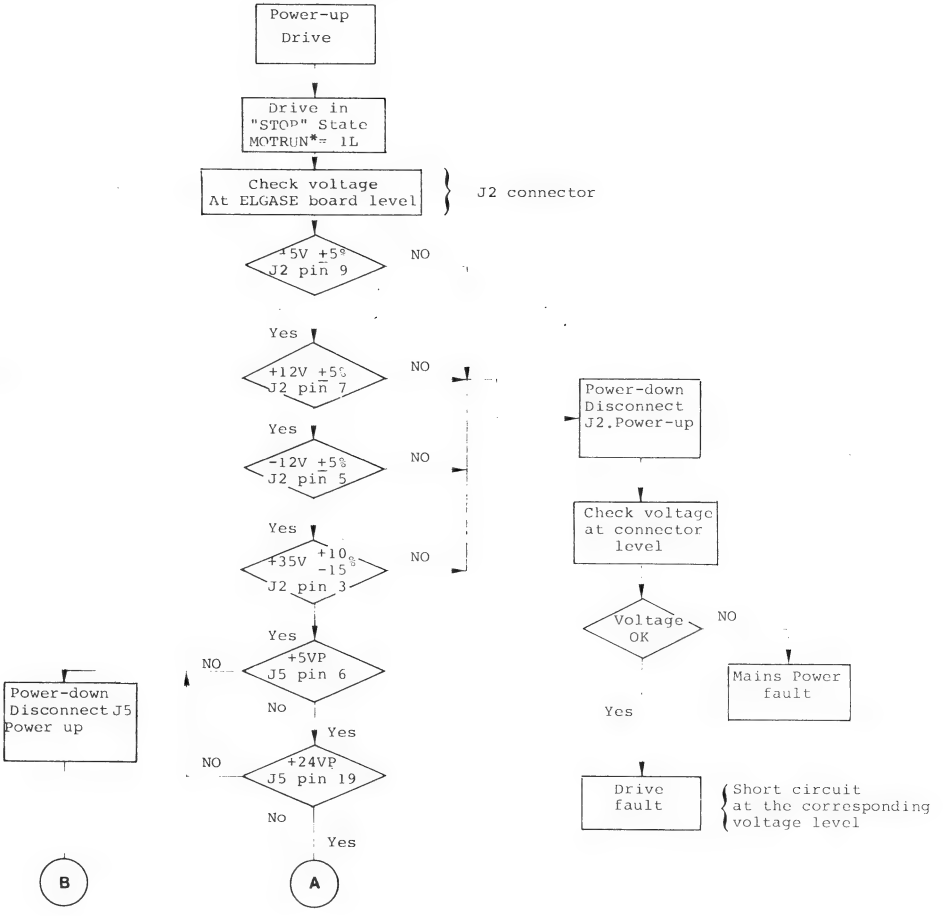
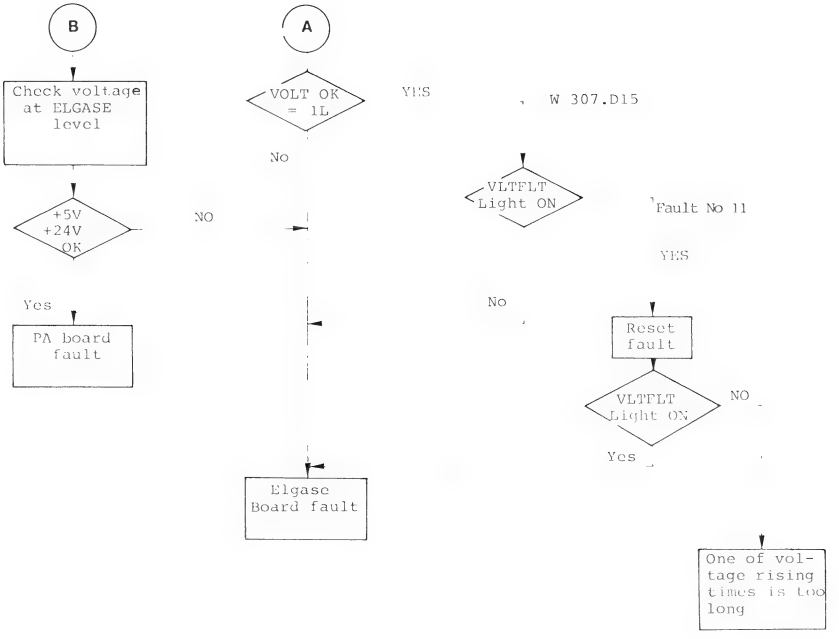
MAJOR DIAGNOSIS



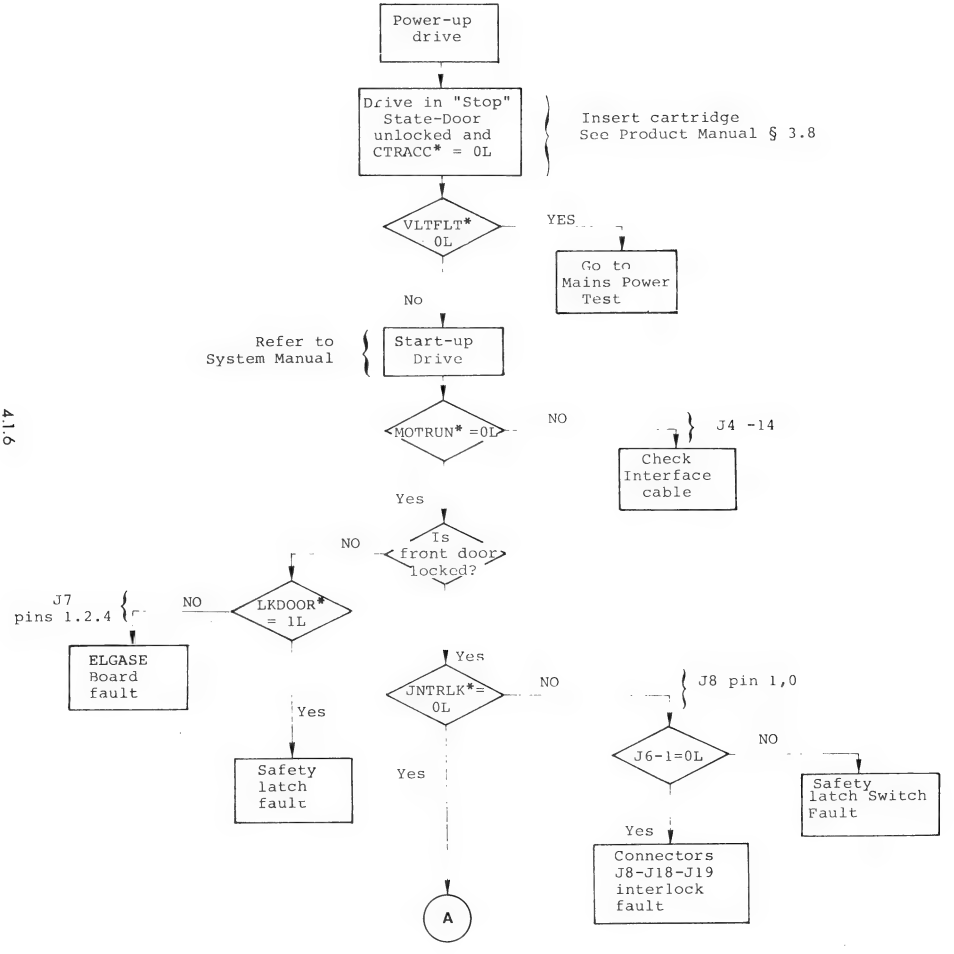
MAIN POWER TEST



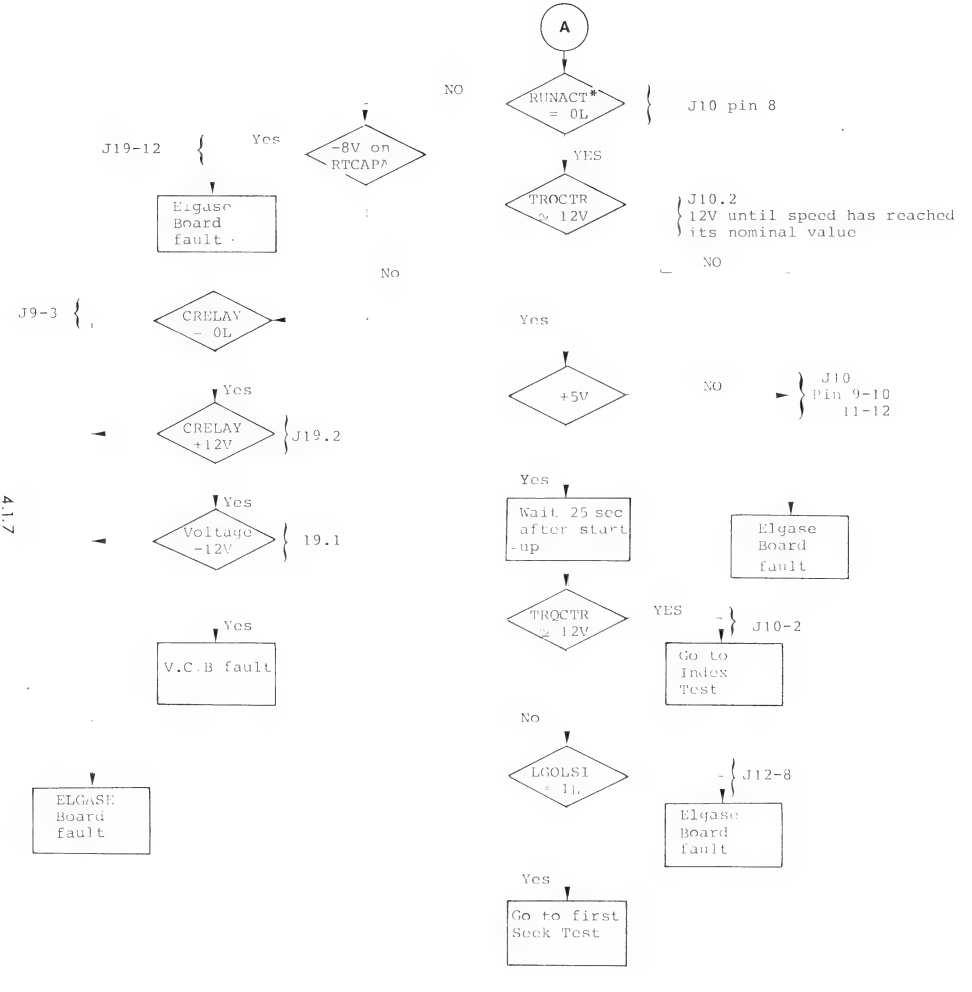
4.1.4


B
A
Check voltage at ELGASE level
VOLT OK = 1L
YES
W 307.D15
No
VLTFLT Light ON
Fault No 11
+5V +24V OK
NO
YES
Yes
No
PA board fault
Reset fault
VLTFLT Light ON
NO
Yes
Elgase Board fault
One of voltage rising times is too long

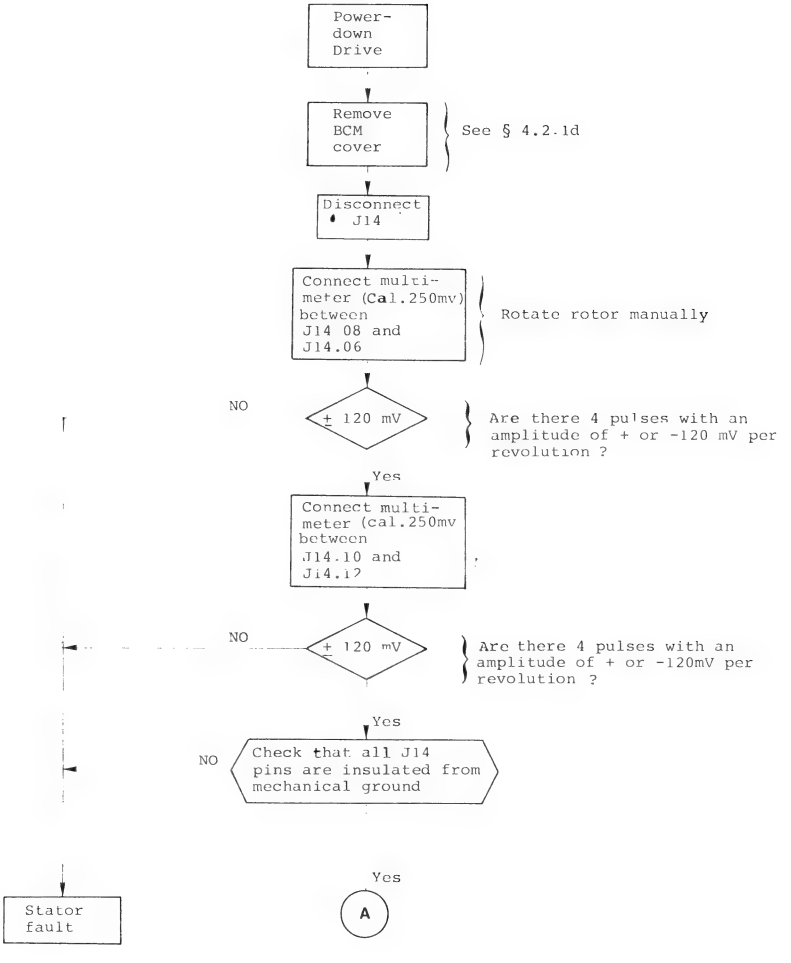
START-UP SEQUENCE TEST

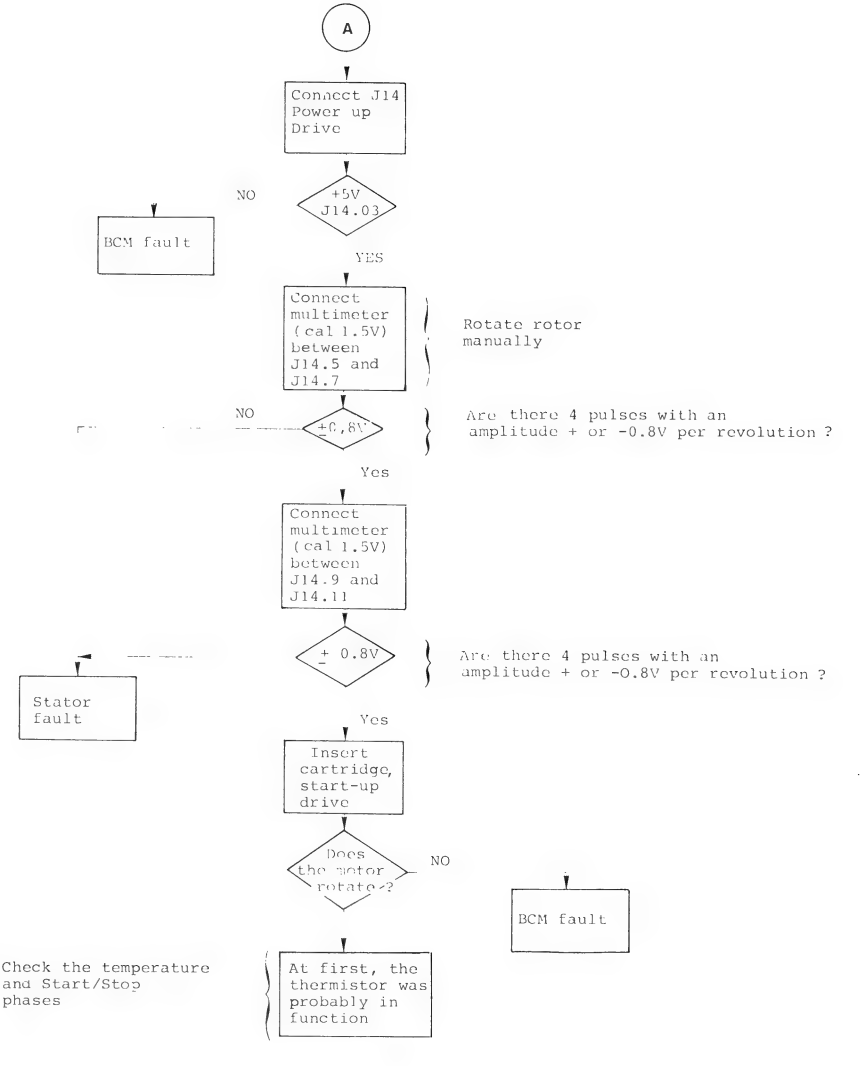


START-UP SEQUENCE TEST

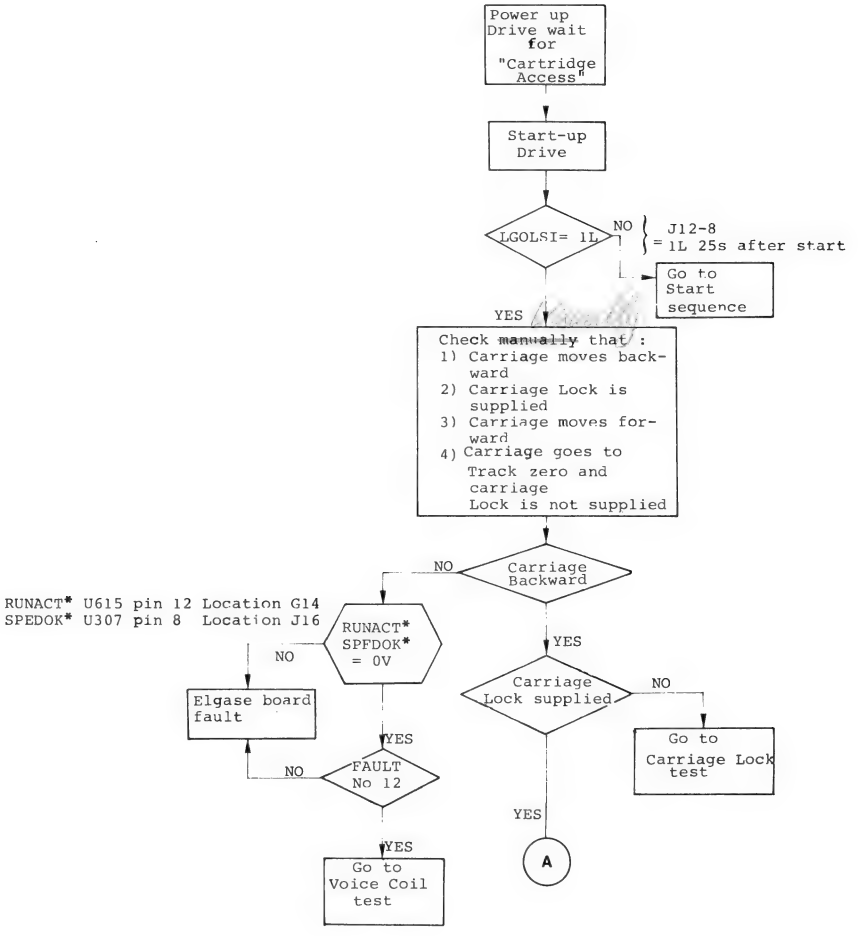


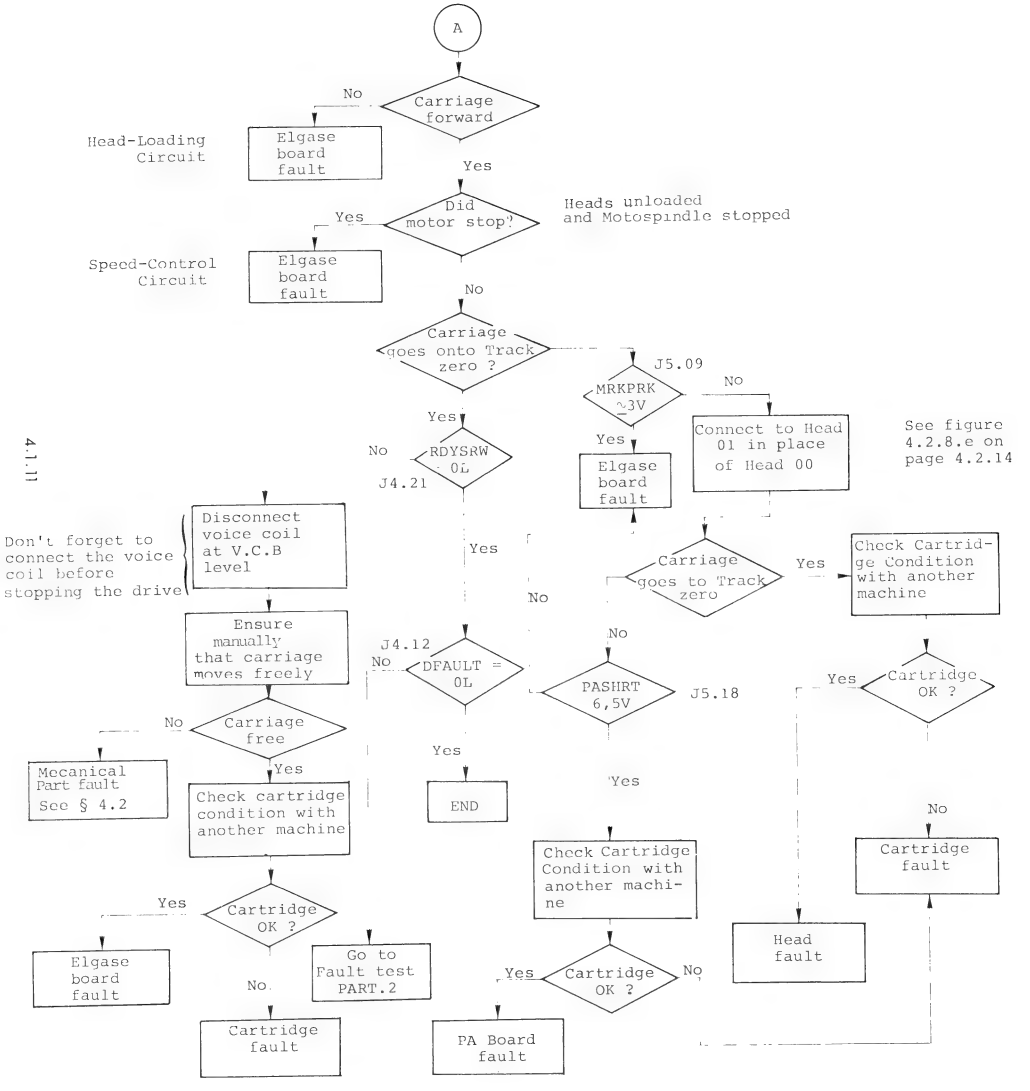
MOTOR TEST

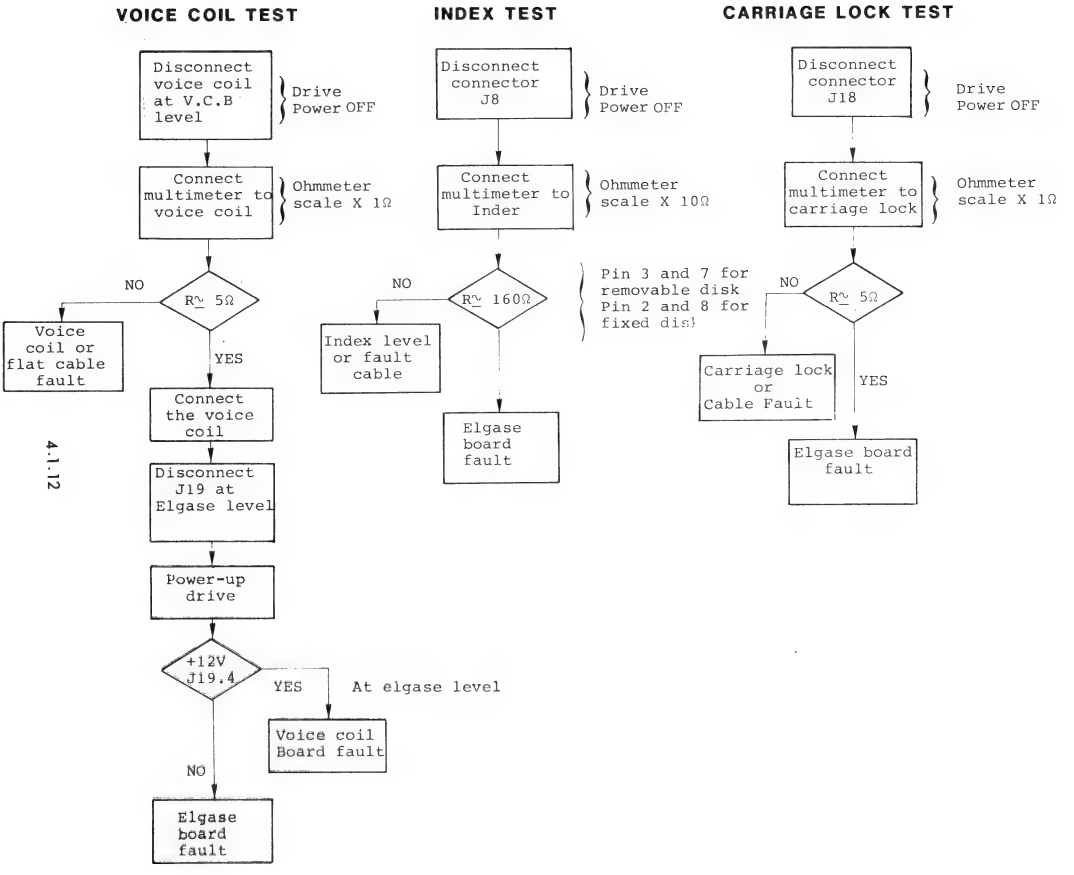

Power-down Drive
Remove BCM cover
See § 4.2.1d
Disconnect J14
Connect multi-meter (Cal.250mv) between J14 08 and J14.06
Rotate rotor manually
NO
± 120 mV
Are there 4 pulses with an amplitude of + or -120 mV per revolution ?
Yes
Connect multi-meter (cal.250mv between J14.10 and Ji4.12
NO
± 120 mV
Are there 4 pulses with an amplitude of + or -120mV per revolution ?
Yes
NO
Check that all J14 pins are insulated from mechanical ground
Yes
Stator fault
A


A
Connect J14
Power up
Drive
+5V
J14.03
NO
BCM fault
YES
Connect
multimeter
(cal 1.5V)
between
J14.5 and
J14.7
Rotate rotor
manually
NO
±0,8V
Are there 4 pulses with an
amplitude + or -0.8V per revolution ?
Yes
Connect
multimeter
(cal 1.5V)
between
J14.9 and
J14.11
± 0.8V
Are there 4 pulses with an
amplitude + or -0.8V per revolution ?
Stator
fault
Yes
Insert
cartridge,
start-up
drive
Does
the motor
rotate ?
NO
BCM fault
Check the temperature
and Start/Stop
phases
At first, the
thermistor was
probably in
function

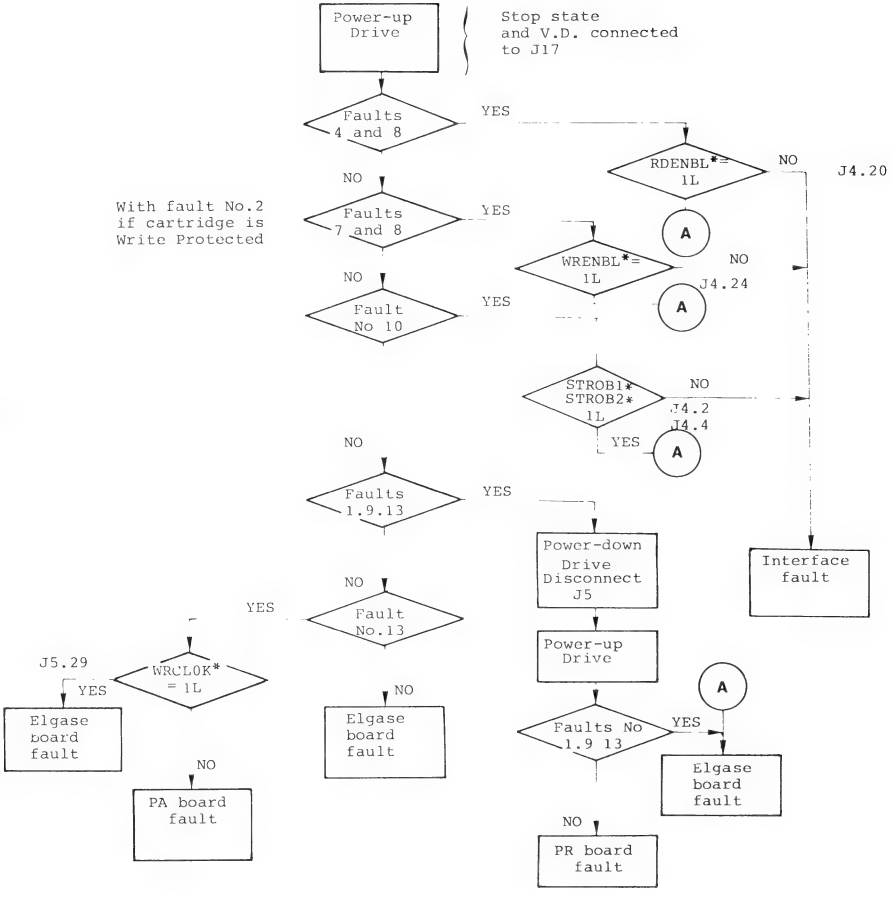
FIRST SEEK TEST




A
Carriage forward
No
Elgase board fault
Head-Loading Circuit
Yes
Did motor stop?
Yes
Heads unloaded and Motospindle stopped
Elgase board fault
Speed-Control Circuit
No
Carriage goes onto Track zero ?
J5.09
MRKPRK ~3V
No
Connect to Head 01 in place of Head 00
See figure 4.2.8.e on page 4.2.14
Yes
Elgase board fault
Yes
No
RDYSRW 0L
J4.21
Disconnect voice coil at V.C.B level
Don't forget to connect the voice coil before stopping the drive
Carriage goes to Track zero
Yes
Check Cartridge Condition with another machine
No
Ensure manually that carriage moves freely
J4.12
No
DFAULT = 0L
No
PASHRT 6,5V
J5.18
Yes
Cartridge OK ?
No
Carriage free
Yes
Mecanical Part fault See § 4.2
Yes
END
Yes
Check cartridge condition with another machine
Check Cartridge Condition with another machine
No
Cartridge fault
Yes
Cartridge OK ?
Yes
Elgase board fault
Go to Fault test PART.2
Yes
Cartridge OK ?
No
Head fault
No
Cartridge fault
PA Board fault

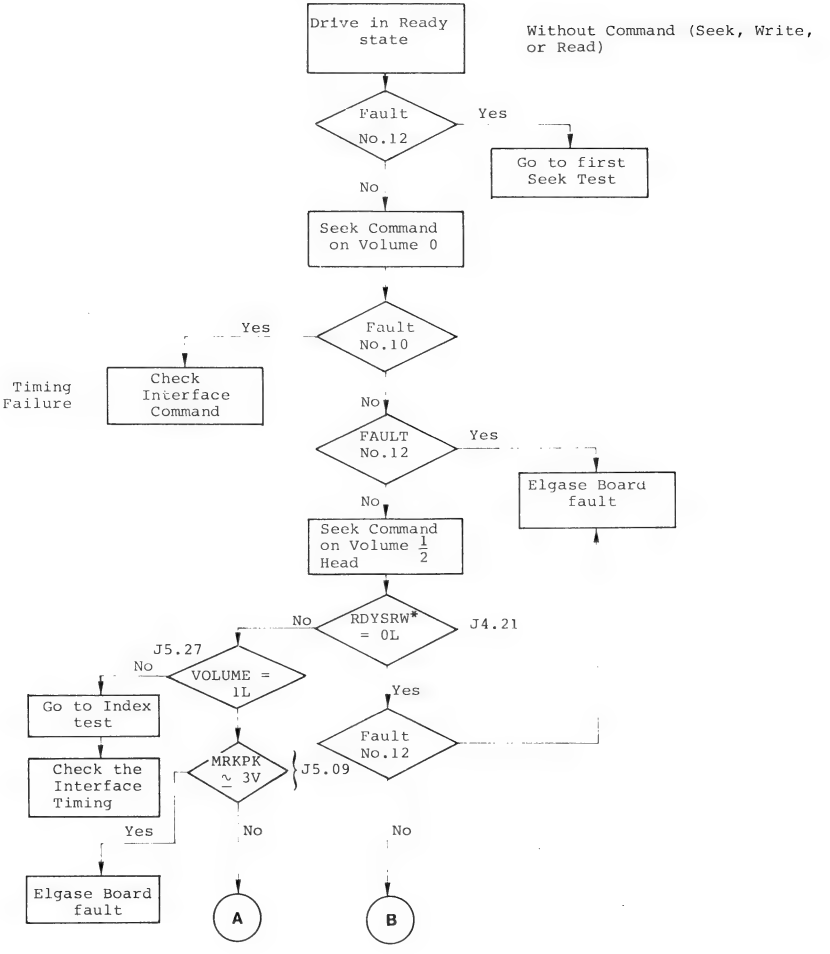

VOICE COIL TEST
Disconnect voice coil at V.C.B level
Drive Power OFF
Connect multimeter to voice coil
Ohmmeter scale X 1Ω
R≂ 5Ω
NO
YES
Voice coil or flat cable fault
Connect the voice coil
Disconnect J19 at Elgase level
Power-up drive
+12V J19.4
YES
At elgase level
Voice coil Board fault
NO
Elgase board fault
INDEX TEST
Disconnect connector J8
Drive Power OFF
Connect multimeter to Inder
Ohmmeter scale X 10Ω
R≂ 160Ω
Pin 3 and 7 for removable disk
Pin 2 and 8 for fixed disk
NO
Index level or fault cable
Elgase board fault
CARRIAGE LOCK TEST
Disconnect connector J18
Drive Power OFF
Connect multimeter to carriage lock
Ohmmeter scale X 1Ω
R≂ 5Ω
NO
YES
Carriage lock or Cable Fault
Elgase board fault

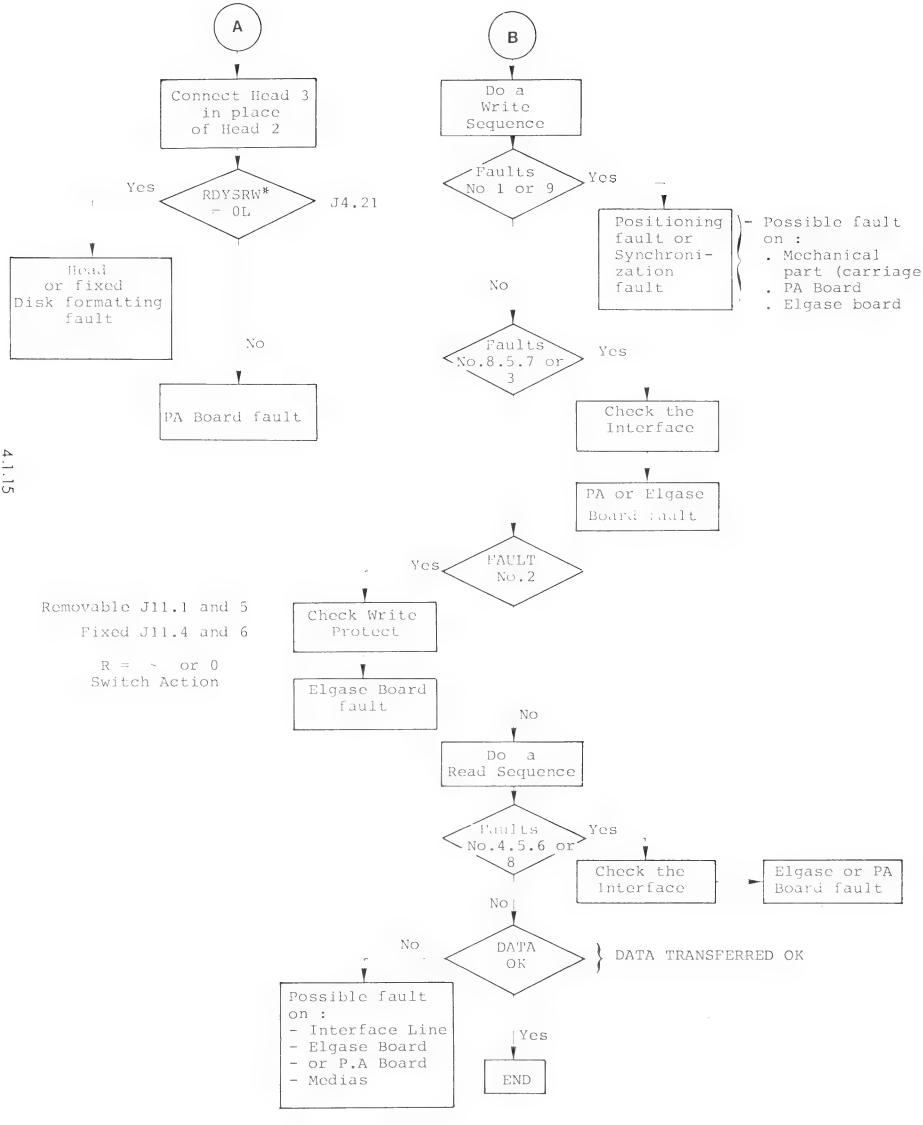
FAULT TEST


Power-up Drive
Stop state and V.D. connected to J17
Faults 4 and 8
YES
NO
RDENBL* = 1L
NO
J4.20
With fault No.2 if cartridge is Write Protected
Faults 7 and 8
YES
NO
A
WRENBL* = 1L
NO
J4.24
Fault No 10
YES
NO
A
STROB1* STROB2* 1L
NO
J4.2
J4.4
YES
A
Faults 1.9.13
YES
NO
Power-down Drive Disconnect J5
Interface fault
Fault No.13
NO
YES
Power-up Drive
J5.29
WRCLOK* = 1L
YES
NO
A
Elgase board fault
Elgase board fault
Faults No 1.9 13
YES
Elgase board fault
NO
PA board fault
NO
PR board fault

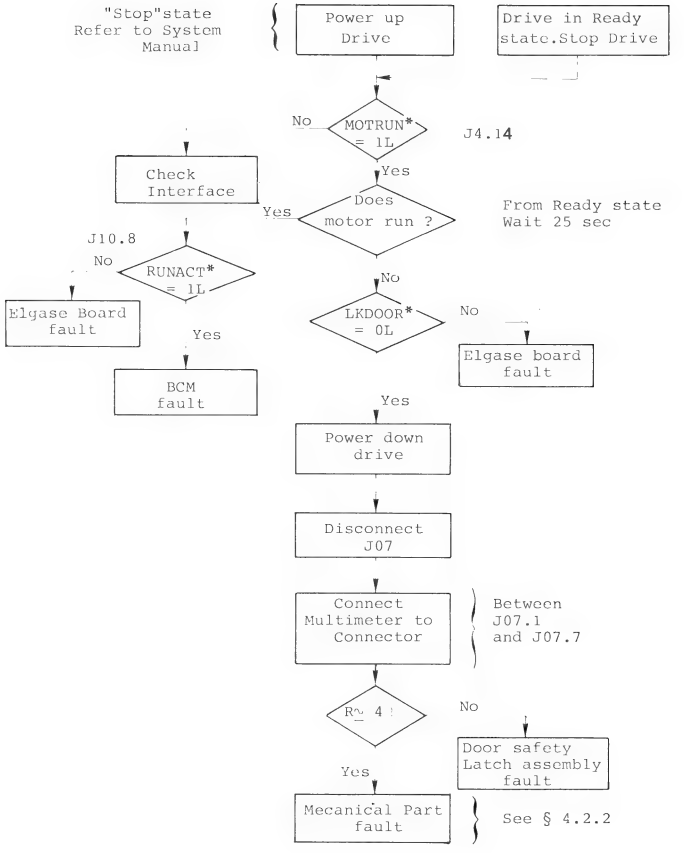
FAULT TEST PART 2

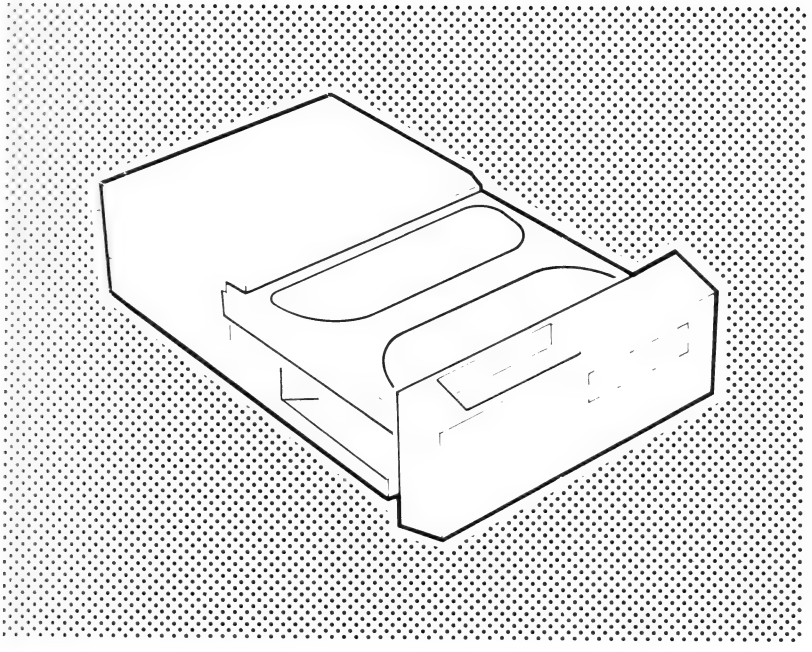
This test must be run with a cartridge ready for use




A
Connect Head 3 in place of Head 2
Yes
RDYSRW* = 0L
J4.21
Head or fixed Disk formatting fault
No
PA Board fault
B
Do a Write Sequence
Faults No 1 or 9
Yes
Positioning fault or Synchroni-zation fault
- Possible fault on :
. Mechanical part (carriage)
. PA Board
. Elgase board
No
Faults No.8.5.7 or 3
Yes
Check the Interface
PA or Elgase Board fault
Yes
FAULT No.2
Removable J11.1 and 5
Fixed J11.4 and 6
R = ~ or 0
Switch Action
Check Write Protect
Elgase Board fault
No
Do a Read Sequence
Faults No.4.5.6 or 8
Yes
Check the Interface
Elgase or PA Board fault
No
No
DATA OK
DATA TRANSFERRED OK
Possible fault on :
- Interface Line
- Elgase Board
- or P.A Board
- Medias
Yes
END

4.1.15


"Stop"state
Refer to System
Manual
Power up
Drive
Drive in Ready
state.Stop Drive
No
MOTRUN*
= 1L
J4.14
Yes
Check
Interface
Does
motor run ?
Yes
From Ready state
Wait 25 sec
J10.8
No
RUNACT*
= 1L
No
LKDOOR*
= 0L
No
Elgase Board
fault
Yes
Elgase board
fault
BCM
fault
Yes
Power down
drive
Disconnect
J07
Connect
Multimeter to
Connector
Between
J07.1
and J07.7
R~ 4 !
No
Door safety
Latch assembly
fault
Yes
Mecanical Part
fault
See § 4.2.2



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SAFETY NOTES

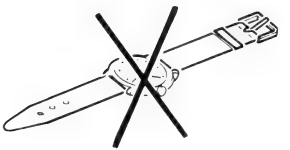
— Before opening the disk drive always ensure that small objects (paper, clips, ashes paper cup, and so on) do not endanger disk cleanliness.

— After any operation requiring the removal of protective parts (covers, panel, collars, and so on) all such parts MUST be refitted before the machine is handed over to the operator.

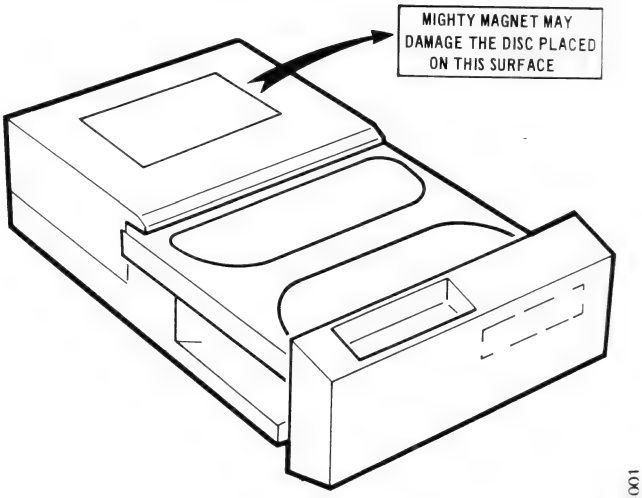
— Switch off the power supplies before any intervention.

WARNING

Do not bring wrist watches near the voice coil magnet as they risk being damaged.



Do not unlatch the security hook of carriage.



47240395.001

4.2.1 PWA's REPLACEMENT

4.2.1a Main Logic Board Replacement (ELGASE)

Material required

- Philips screwdriver

Disassembly see figure 4.2.1a

Unscrew seven screws 1 to 7.

Unscrew the rear shock absorber 8.

Remove the washer 9.

Disconnect connectors J01, J04, J02, J5, J6, J7, J8, J11, J18, J19, J10 and J15.

Remove the main logic board.

Reassembly

Proceed in reverse order (do not forget WASHER 9, THE LOCATION OF THIS ONE IS UNDER THE ELGASE BOARD).

— It is mandatory that the insulating plate and the 7 screws are reassembled.

— The cables must be under the insulating plate.

4.2.1b LSI Replacement

Material required

- Small screwdriver.

Disassembly see figure 4.2.1b

Set the machine on side (see figure 4.2.1a)

Insert the screwdriver between the LSI and its support.

Pull out the LSI.

Reassembly

Plug in the LSI. This one must be located as shown in figure 4.2.1b

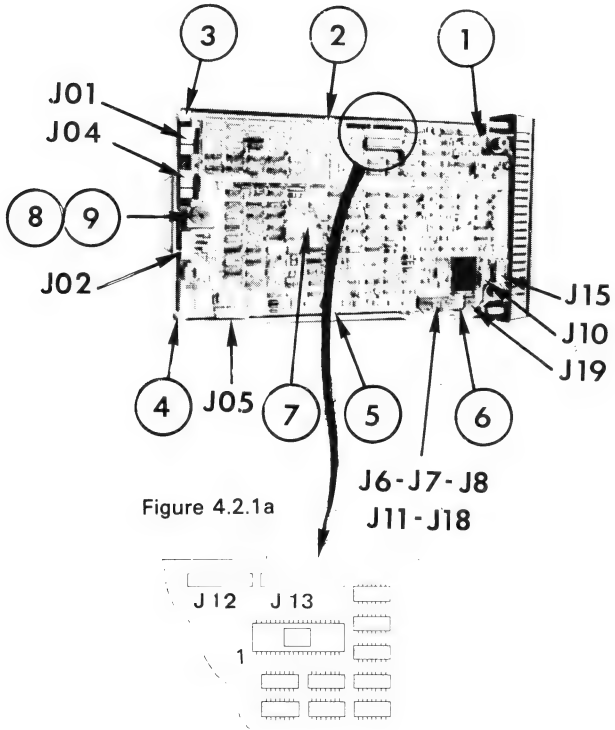


Figure 4.2.1a

Figure 4.2.1b

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4.2.1c Pre-Amplifier Board Replacement (P.A.)

Material Required

- Allen wrench 4 mm
- screwdriver.

Disassembly see figure 4.2.1c

Remove top cover.

Disconnect four head connectors 0, 1, 2 and 3.

Disconnect connector J05.

Remove three screews A, B, C.

Remove the P.A. board.

Reassembly Proceed in reverse order.

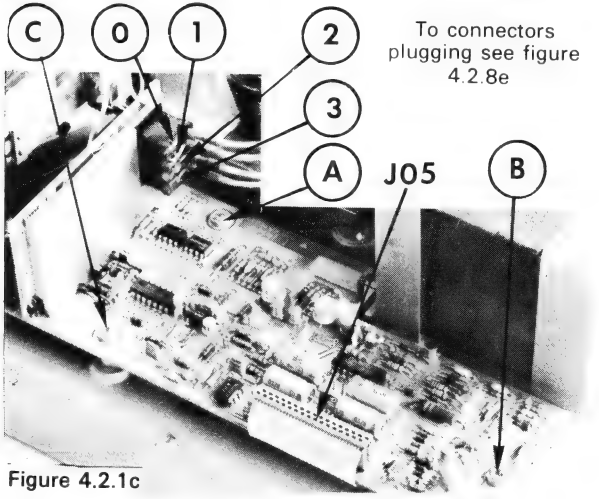

Figure 4.2.1c

4.2.1d Motor Control Board Replacement (B.C.M.)

Warning - hazardous voltage (70 v pick) on power transistor cases.

Material Required

- Philips screwdriver
- Wrench 10 mm

Disassembly see figure 4.2.1d

— Remove Main Logic Board (see par. 4.2.1a)

— Open front door

— Remove cover H (unscrew 2 screws K)

— Disconnect connector J14 - J15 - J10

— Unscrew three bolts 1 to 3 and disengage the motor control board

Reassembly Proceed in reverse order.

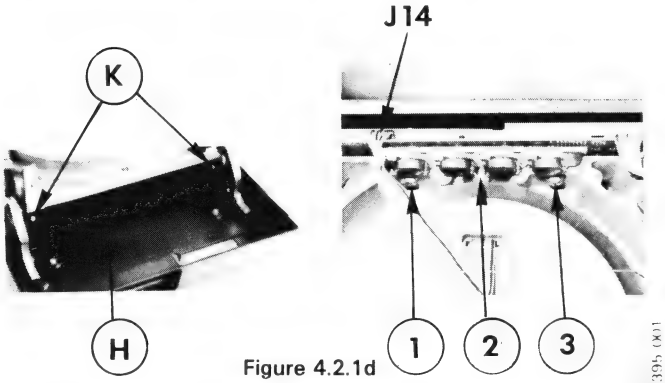

Figure 4.2.1d

4.2.1e Voice Coil Board Replacement (V.C.B.)

Material Required

- Philips screwdriver
- Screwdriver

Disassembly

— Remove top cover

— Disconnect connectors J19 and J20

— Unscrew 2 screws J

— Remove Voice Coil Board.

WARNING

— *During these operations, take care for flat cable feeding voice coil*

— *Do not unlock the carriage.*

Reassembly

Proceed in reverse order

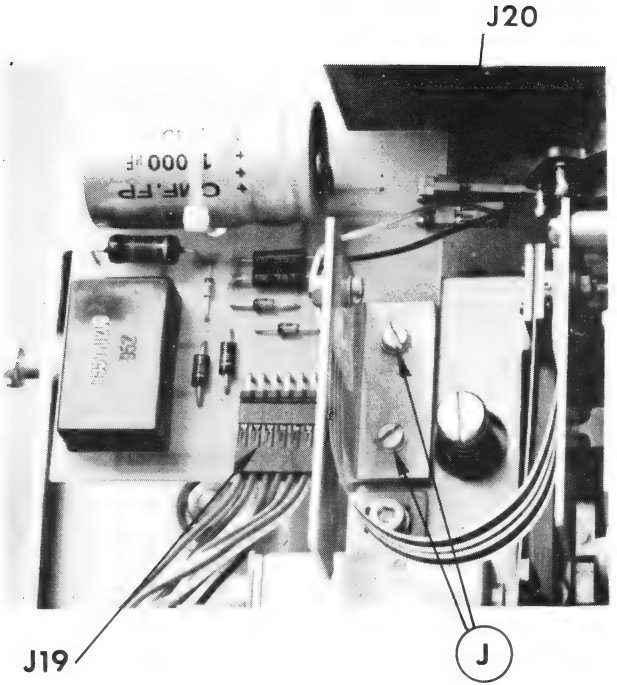

Figure 4.2.1e

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4.2.1f Interface board UD169 replacement (Only D141)

— **Material required.**
- Wrench 5,5 mm

— **Disassembly**

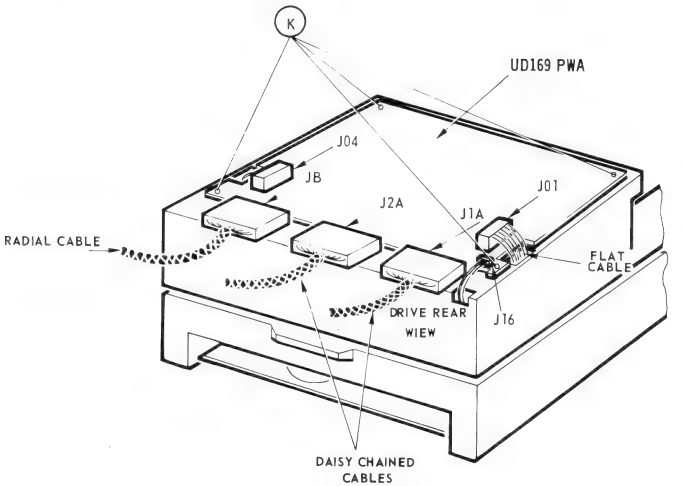
— Disconnect J01, J04, JB, J1A, J2A, J16.

— Unscrew 4 nuts K.

— Remove the UD169 board.

Reassembly

Proceed in reverse order.



4.2.2 DOOR SAFETY LATCH ASSEMBLY REPLACEMENT See location Figure 4.2.2a

Material Required

- Allen wrench (3 and 4 mm)
- Set of shims

Preliminary operation

— Remove the main logic board (see par. 4.2.1a)

— Dismount the two plastic cable clamps

— Open front door

Disassembly

— Unscrew the two screws K and L (figure 4.2.2b

— Remove the complete assembly

Reassembly

Proceed in reverse order.

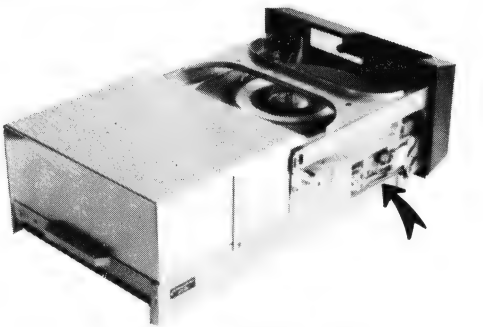


Figure 4.2.2a

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— Loosen screws k and L

— Push on latch N and partially open the front door.

— Displace the assembly so as to obtain an air gap M. (See figure 4.2.2c) between N and O.

— Front door closed displace the door safety latch assembly so as to obtain an air gap P. (See figure 4.2.2b)

— Tighten the screws. K and L.

— Check : that the air gaps Mand P have not changed.
: that the micro switch R switches ON and OFF with a safety margin.

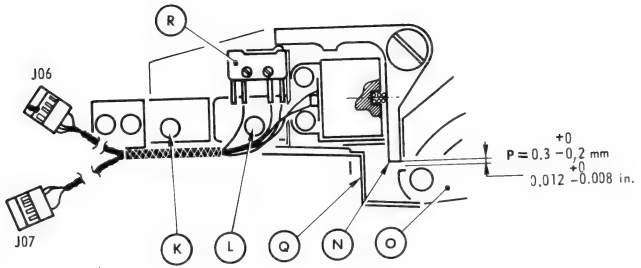

Figure 4.2.2b

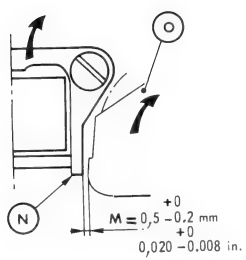

Figure 4.2.2c

4-2.3 HEAD LOADING ELECTRO-MAGNET ASSEMBLY REPLACEMENT

Material Required

- Wrench 8 mm
- Philips screwdriver
- Allen Wrench 3 mm
- Set of shims
- Screwdrivers

Preliminary operation

— Remove top cover

— Remove the Main Logic Board (see par. 4.2.1a)

Disassembly

WARNING

During all this operation, take care to maintain the door open so that the heads cannot be loaded.

— Remove the voice coil board as indicated in 4.2.1e.

— Unscrew the 2 fixing screws S (see figure 4.2.9e). Then remove the complete assembly.

— Unscrew the screws T and U (see figure 4.2.3a).

— Set the new electro magnet

— Adjust electro-magnet on assembly to obtain travel V by screews T.

— Set on machine the electro magnet assembly by screews S.

— Shut the door (see warning).

— Adjust the assembly by screws S to obtain air gaps W and X to conform figure 4.2.3b.

— Mount the other parts in reverse order.

— Check that the leaf spring is on the rest stop.

WARNING

During this operation and during the adjusting, maintain the carriage in retract position to avoid the head loading.

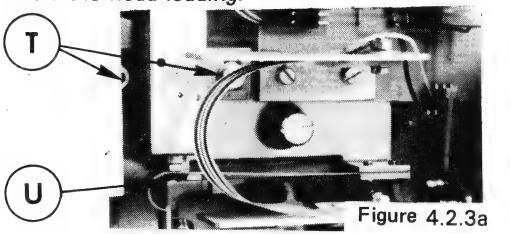

Figure 4.2.3a

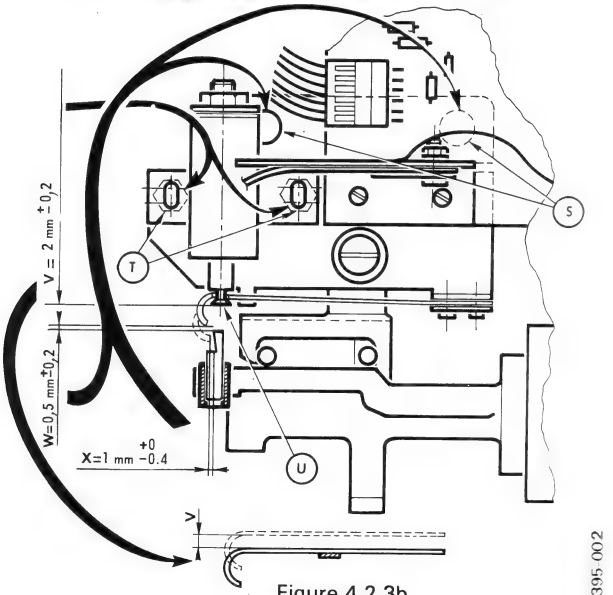

Figure 4.2.3b

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4.2.4 AIR FILTER REPLACEMENT

Material Required

- Philips screwdriver
- Allen wrench 4 mm

Preliminary operations

— Remove Main Logic Board (see par. 4.2.1a)

— Open front door

— Remove cover H (unscrew two screws ! Figure 4.2.4a)

— Disconnect connector J14. (Figure 4.2.1d).

Disassembly (figure 4.2.5)

— Unscrew 4 screws Y

— Remove press-filter and filter.

Reassembly

Proceed in reverse order.
After reassembly, let the drive run 3 to 5 minutes without heads being loaded (disconnect J20 p. 4.2.5 before RUN).

WARNING

1) At crossing of air-filter joint, index wires must be placed parallel and at a distance of about 5 mm 0,2 inch (figure 5.4b) to obtain a good seal.

2) After each air filter disassembly, the filter must be replaced.

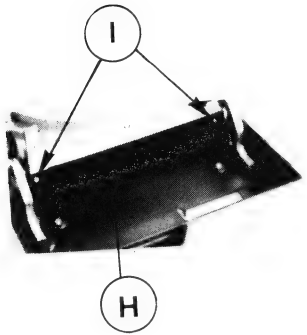

Figure 4.2.4a

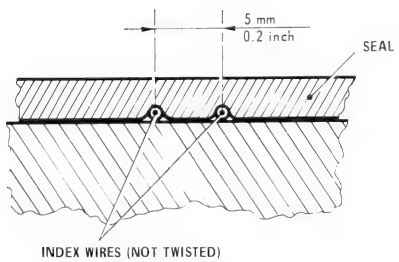

Figure 4.2.4b

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4.2.5 D.C. MOTOR REPLACEMENT

4.2.5a Motor Stator Replacement

Material Required

- Philips screwdriver
- Allen wrench 4 mm
- Wrench 7 mm

Preliminary operations

See preliminary operations in par. 4.2.4

Disassembly (figure 4.2.5)

— Unscrew 4 screws Z

— Remove press-filter and stator holder assembly (Pull enough to overcome opposition of joint)

— Remove filter

— Unscrew 3 nuts A

— Remove stator

Reassembly

Proceed in reverse order (change filter seal or filter).

After reassembly, let the drive run 3 to 5 minutes without heads being loaded (disconnect J20 p. 4.2.5 before RUN).

4.2.5b Motor Rotor Replacement

This operation can be executed only in factory or repair center equipped with special tool and air cleaning device.

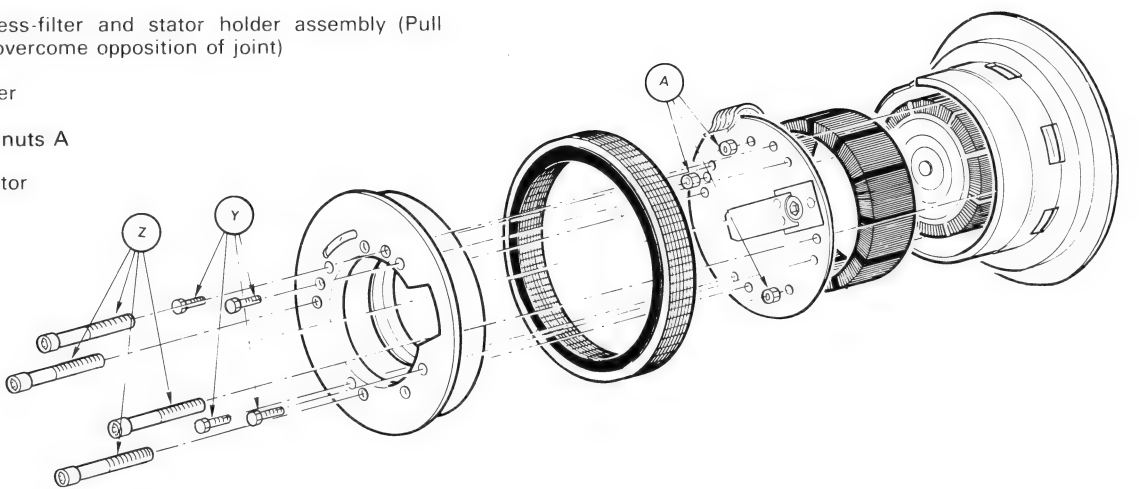

Figure 4.2.5

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4.2.6 MAGNETIC INDEX MARKS ASSEMBLIES REPLACEMENT

4.2.6.a Fixed Disk Index Mark Assembly

See location Figure 4.2.6a.

Material Required

- Screwdriver
- Allen wrench 4 mm

Preliminary operation

Remove motor stator and filter as indicated at par. 4.2.5a.

Disassembly (figure 4.2.6b)

— Unscrew the two screws b and c. Take care to the two seals on the screws.

— Remove the assembly.

Reassembly (figure 4.2.6b)

— Rotate the assembly on its axis in order to put screw d against the finger e.

— Tighten the screws b and c.

— Proceed in reverse order for the other parts (change filter seals or filter).

— After reassembly, let the drive run 3 to 5 minutes without heads being loaded (disconnect J20 p. 4.2.5 before RUN).

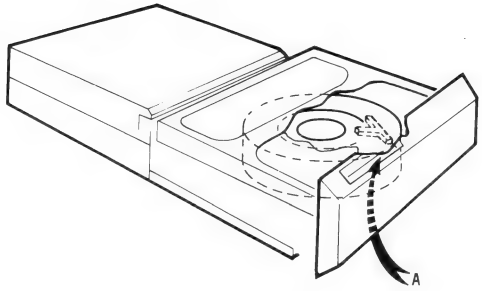

Figure 4.2.6a

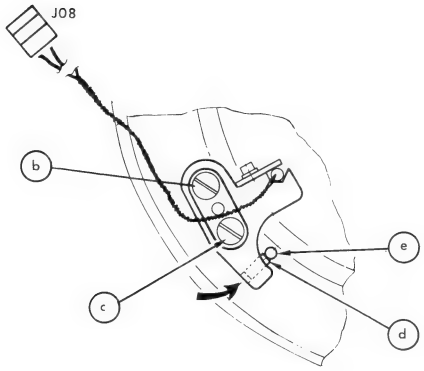

Figure 4.2.6b

4.2.6b Removable Disk Index Mark Assembly

This operation can be executed only in factory or repair center equiped with special tool and air cleaning device.

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4.2.7 GRAPHITE CONTACT REPLACEMENT

Material Required

- Philips screwdriver
- Pliers
- Allen wrench 2,5 and 3 mm

Preliminary operation

— Remove main logic board as indicated at par. 4.2.1a.

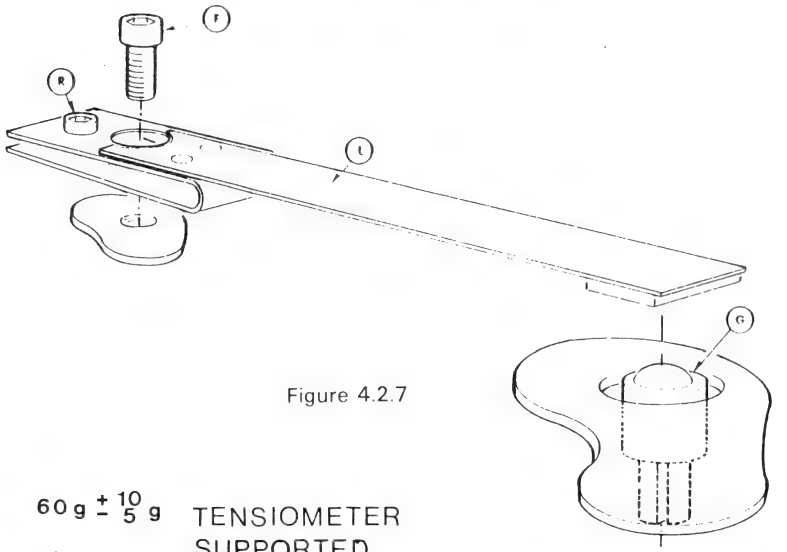

Figure 4.2.7

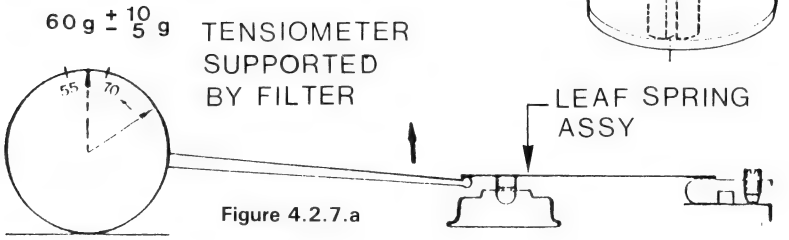

Figure 4.2.7.a

Disassembly

— Unscrew the screw F (figure 4.2.7.)

— Remove the contact leaf spring L.

— Pull the graphite contact G with pliers to remove it.

Remounting

— Set the contact leaf spring L and screw F.

Coarse adjustment

— Unscrew setscrew R so that the copper contact of the leaf spring does no longer make contact with the carbon brush.

— Screw slowly till the copper contact makes contact with the carbon brush.

— Screw 3 turns to be sure of correct pressure.

Fine adjustment

— Unscrew setscrew (R) so that the copper contact of the leaf does no longer make contact with the carbon brush.

— Screw slowly till obtain a pressure of 60 g $^{+10}_{-5}$ **g** (Fig. 4.2.7.a

Reassembly

Proceed in reverse order

4.2.8 HEAD REPLACEMENT. 47 224 218-001 LOWER -002 UPPER

WARNING

Do not put your fingers on the head pad.

Material Required

- Allen wrench 3/32 in.
- Screwdriver

Preliminary operation

— Open the door

— Remove top cover

— Unplug the connector corresponding to the head to be changed

— Insert a piece of paper or cartoline between the two heads.

HEAD PRESENTATION TOOL

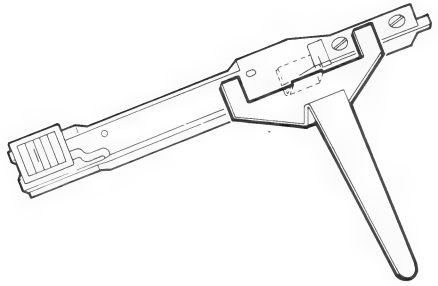

Figure 4.2.8a

4.2

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Disassembly

— Unscrew the screw h (figure 4.2.8b) and remove the head to be changed.

Reassembly

— Place the head on the loading finger i (figure 4.2.8b)

— For this use the head presentation tool (Figure 4.2.8a)

— Engage part j of the head (figure 4.2.8b)

— Engage part k in the slot of the carriage and push it in U then m direction (figure 4.2.8d) and n direction (figure 4.2.8c)

— Tighten the screw h

— Plug the connector on P.A. board (figure 4.2.8e)

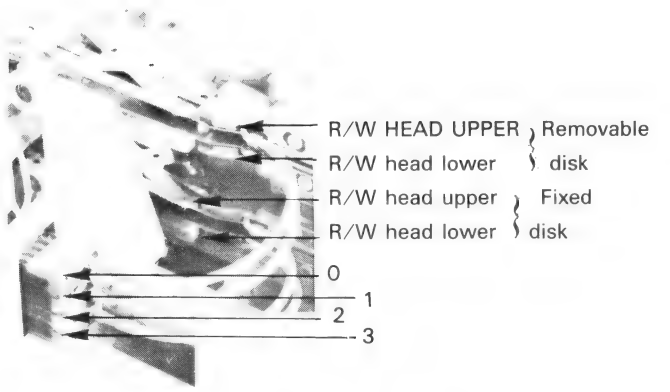

Figure 4.2.8e

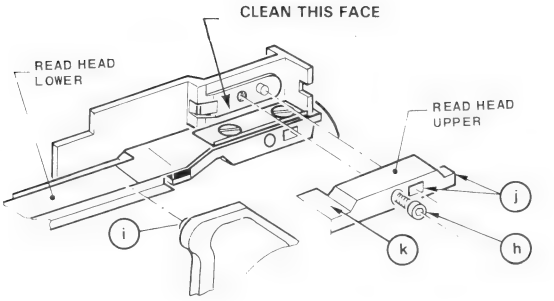

Figure 4.2.8b

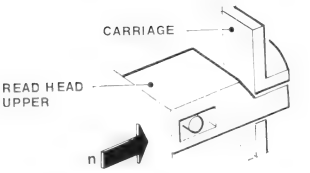

Figure 4.2.8c

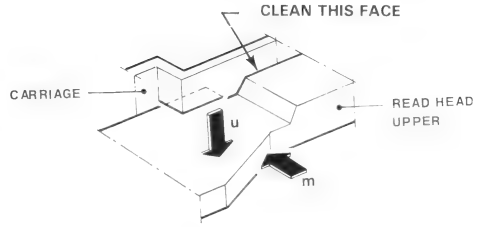

Figure 4.2.8d

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4.2.9 VOICE COIL AND CARRIAGE ASSEMBLY REPLACEMENT

4.2.9a Coil Replacement

Material Required

- Philips screwdriver
- Allen wrench 5 mm
- Soldering iron
- Screwdrivers

Preliminary operation

— Remove top cover

— Remove Main Logic Board as indicated in par. 4.2.1a.

Disassembly

— Unscrew 4 screws A (magnetic pot). Figure 4.2.9a access holes under the table.

— Push the magnet assembly backward in order to disengage this one from the coil (figure 4.2.9b).

— Unsolder voice coil wires at points P (figure 4.2.9b)

— Unscrew 3 screws Q (inside coil, figure 4.2.9c)

— Remove the coil.

Reassembly

— Proceed in reverse order. Take care in positionning magnet assembly on its stops R and S (Push forward in 1 direction then on side in 2 direction) (figure 4.2.9d).

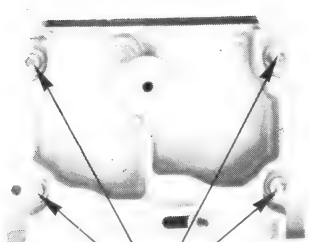

Figure 4.2.9a

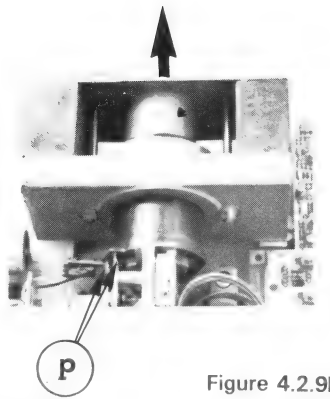

Figure 4.2.9b

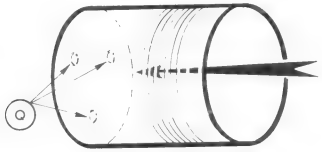

Figure 4.2.9c

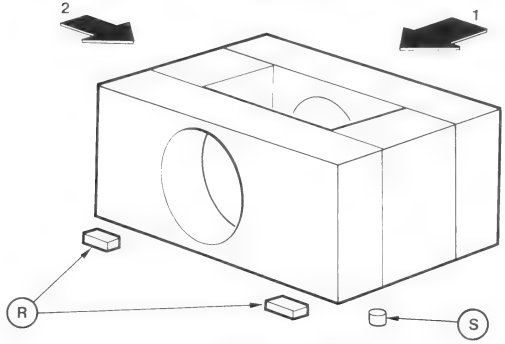

Figure 4.2.9d

4.2

4.2.9b Carriage Assembly Replacement

Material Required

- Screwdriver
- Philips screwdriver
- Allen Wrench 4 and 5 mm
- Soldering iron
- Wrench 8 mm

Preliminary operation

— Remove top cover

— Remove Main Logic Board as indicated at par. 4.2.1a.

— Open front door

Disassembly (figure 4.2.9e)

— *Proceed as in par 4.2.9a. Don't remove the coil.*

— Disconnect and remove the 4 heads (see 4.2.8).

— Disconnect J20 - J19 (figure 4.2.1c).

— Unscrew the screw t

— Unscrew the screws u and remove the parts v and w

— Unscrew the screws S and remove the head loading safety assembly

— Unscrew and remove screw x

— Remove the plate y

— Remove carriage backward

Reassembly

— Proceed in reverse order to reassemble the carriage with flat cable.

— Set in place carriage and other parts : v, w and y

— Adjust carriage thrust as indicated at par. 4.2.10.

— Adjust head loading finger 4.2.11.

— Reassemble head loading safety assembly and adjust electro-magnet as indicated at par. 4.2.3.

— For the other parts proceed in reverse order.

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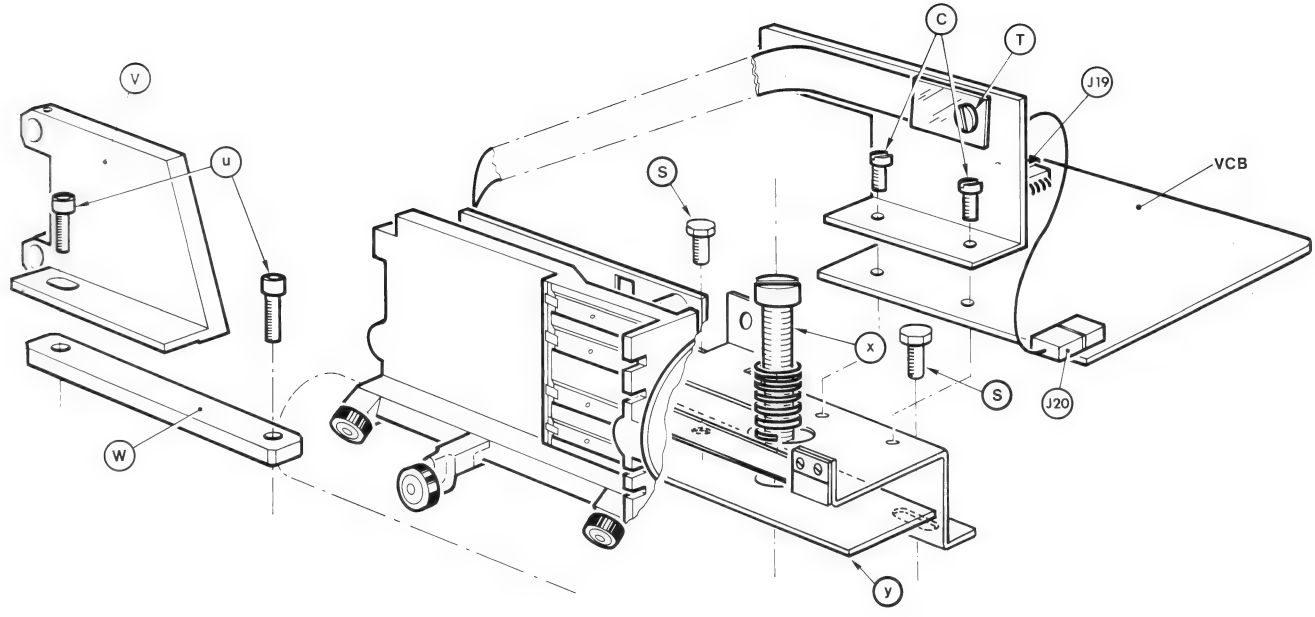

Figure 4.2.9e

4.2.10 CARRIAGE THRUST ADJUSTMENT

Material Required

- Allen Wrench 3/32 in.
- Screwdriver
- Wrenches 8 mm
- Carriage adjusting gauge

Preliminary operation

— Remove the top cover

— Remove the four heads (see par. 4.2.8)

— Disconnect J19 - J20 connectors (figure 4.2.9e)

— Unscrew the screw T and screws S (see figure 4.2.9e) and remove the assembly.

— Shut the door.

Adjustment procedure

Set the hole of gauge on the spindle cone and the other extremity carriage side. See figure 4.2.10a.
Unscrew screws 1 and 2, see figure 4.2.10c and displace the carriage introducing finger A into the gauge slot. See figure 4.2.10b.
Push B thrust in H direction so that retract fork C comes into contact with carriage finger D.
Then tighten screws 1 and 2.

Reassembly

Proceed in reverse order.
Then adjust the electro-magnet assembly (see par. 4.2.3).

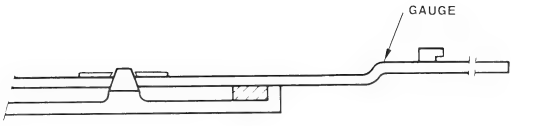

Figure 4.2.10a

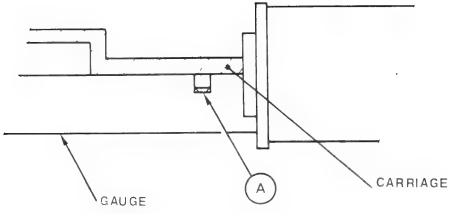

Figure 4.2.10b

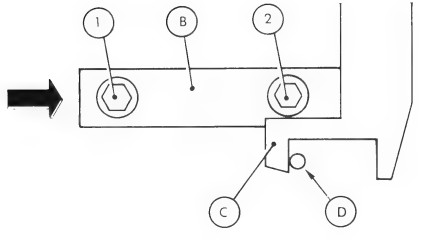

Figure 4.2.10c

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4.2.11 HEAD LOADING FINGER ADJUSTMENT

Material Required

- Allen wrenches 3/32 in and 4 mm.
- Carriage adjusting gauge

Preliminary operation

— Remove top cover

— Remove the 2 removable disk heads (see par. 4.2.8).

Adjustment procedure

— Unscrew screw U

— Set the hole of gauge on the spindle cone and the other extremity carriage side (figure 4.2.11a).

— Push head loading finger assembly in A direction (against rail) then in B direction (against stop M of gauge).

— Tighten screw U.

— Remove gauge.

Reassembly

Proceed in reverse order.

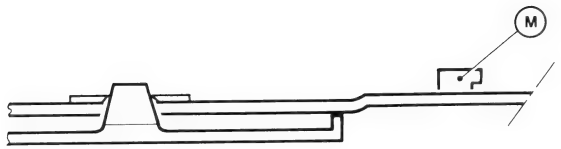

Figure 4.2.11a

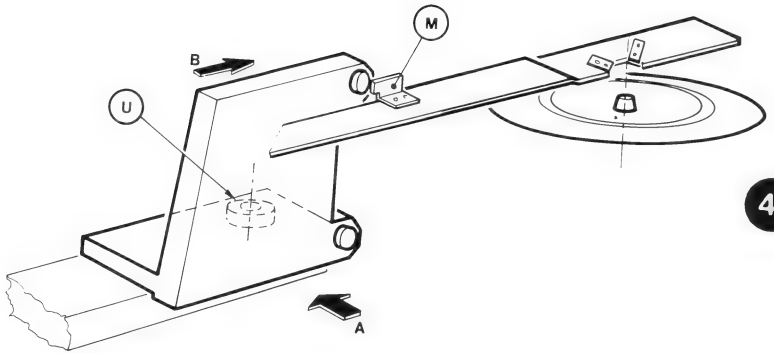

Figure 4.2.11b

4.2.12 Write Protection of Removable Disk Option Installation

Material required

— Screwdriver

Preliminary operation

— Remove top cover.

— Remove main logic board, see par. 4.2.1a.

Installation

Proceed as indicated figure 4.2.12. Tighten the screws H.
Insert a cartridge.
Adjust the assembly so as to set the switch roller at the center of the cartridge write protection location.
Tighten the screws N.
Check that the micro-switch switches ON and OFF with a safety margin (adjustment by screws H).
Connect the connector on J11 at Main Logic board level
Remount Main Logic board and top cover.

Removing

Loosen 2 screws (N) and slide the switch bracket.

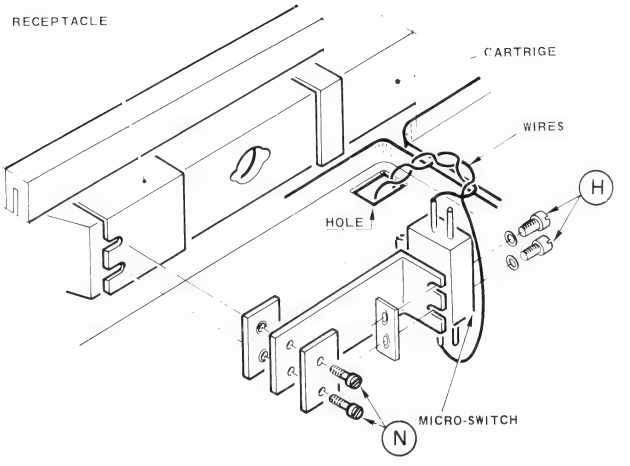

Figure 4.2.12

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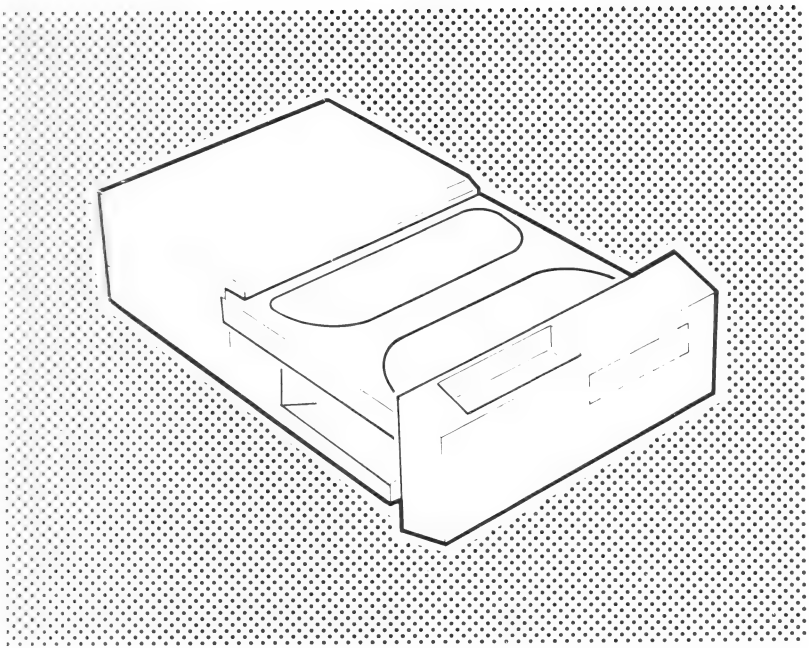

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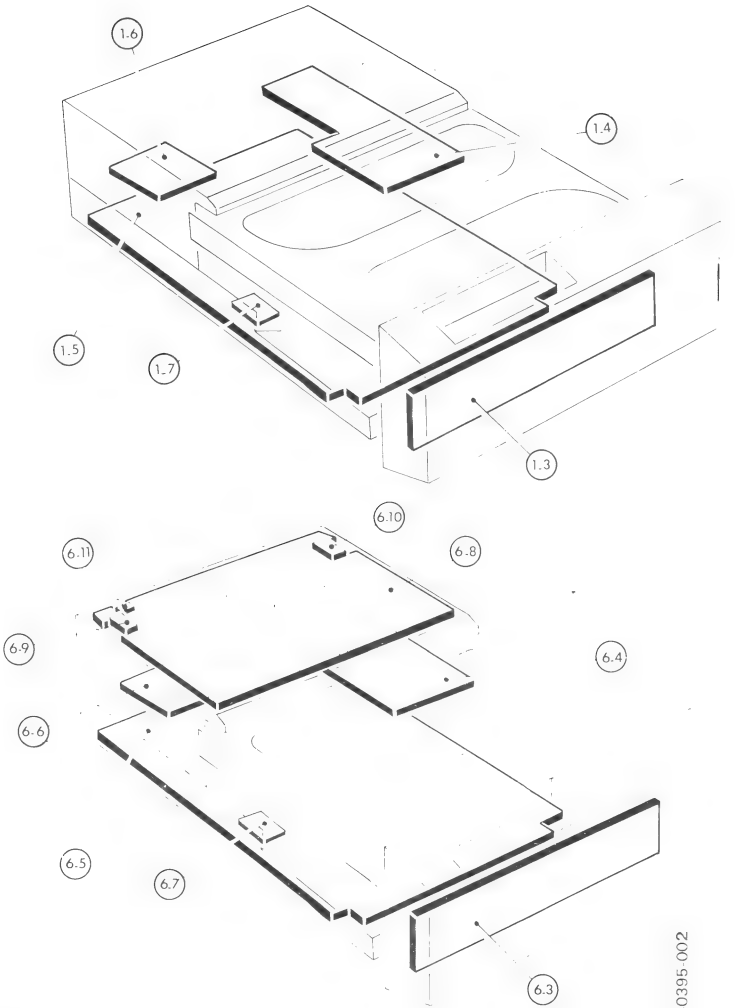
ISK N° 1 — PMSL 141 A (FOR D 140)

ITEM	DESCRIPTION	IDENTIFICATION	Qty
1	Read Head - Lower	47224218-001	1
2	Read Head - Upper	47224218-002	1
3	BCM PWA IV 1	47231017-103	1
4	PA PWA IV 1	47234666-003	1
5	ELGASE (Main Board) PWA	47238225-003	1
6	VCB PWA	47234763-101	1
7	LSI	76970037-001	1

ISK N° 6 — PMSL 146 A (FOR D 141)

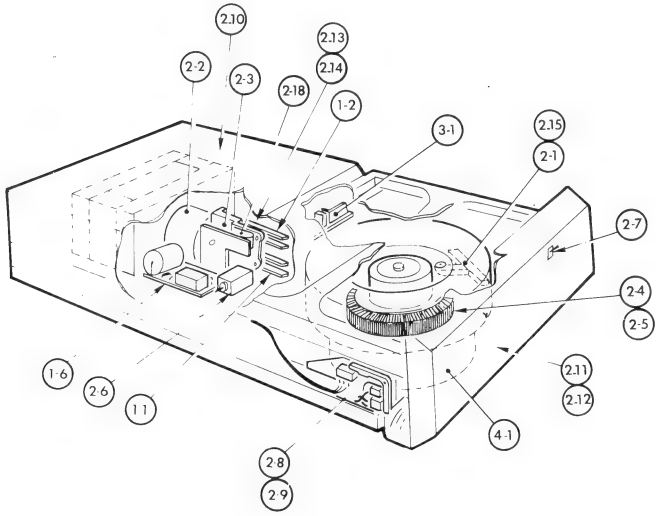
ITEM	DESCRIPTION	IDENTIFICATION	Qty
1	Read Head - Lower	47224218-001	1
2	Read Head - Upper	47224218-002	1
3	BCM PWA IV 1	47231017-103	1
4	PA PWA IV 1	47234666-003	1
5	ELGASE (Main Board) PWA	47238223-003	1
6	VCB PWA	47234763-101	1
7	LSI	76970037-001	1
8	INTERFACE BOARD UD 169	47230174-005	1
9	LOGIC CABLE (J01)	47234822-001	1
10	LOGIC CABLE (J04)	47234823-001	1
11	CABLE (J16)	47229291-002	1



47240395-002

ITEM	DESCRIPTION	IDENTIFICATION	Qty
1	Fixed Disk Magnetic Index Assembly	47231108-003	1
2	Wired Voice Coil	47227338-002	1
3	Carriage Assembly	47238426-001	1
4	Motor Stator	47231096-005	1
5	Motor Air-Tightness seal	76953257-001	2
6	Head Loading Electro-Magnet	47238385-001	1
7	Fixed Disk Write Protect	47231036-001	1
8	Door Safety Latch Assembly	47231056-003	1
9	Leaf Spring	47229222-001	2
10	PA Cable	47224187-002	1
11	Contact Spring	47234830-001	1
12	Graphite Contact	47234774-001	1
13	Special Screw of Carriage Guide	47231007-001	1
14	Spring of Carriage Guide	47227375-001	1
15	Index Fixing Screw	47229027-002	1
16	Cable Clamp	76951240-006	20
17	Staple on ELGASE Board	76956151-001	5

ITEM	DESCRIPTION	IDENTIFICATION	Qty
18	Voice Coil Flat Cable Connection	47231034-001	2
19	Upper Air Filter seal	47227421-006	1
20	Lower Air Filter seal	47231009-001	1
21	Adjust screw (spring contact)	76951133-502	1



IKS N° 3 — PMSL 143 A

ITEM	DESCRIPTION	IDENTIFICATION	Qty
1	Wired Write Protect Assembly (Removable Disk)	47238438-001	1

ISK N° 4 — PMSL 144 A

ITEM	DESCRIPTION	IDENTIFICATION	Qty
1	Air Filter Assembly	47231008-001	1

ISK N° 5— PMSL 145 A

ITEM	DESCRIPTION	IDENTIFICATION	Qty
1	Carriage Adjusting Gauge	47229211-003	1
2	Head presentation tool	47238478-001	1
4	**Faults Visu. PWA**	47238239-001	1

PWA'S INTERCHANGEABILITY

All PWA's with the same industrial number and the same technical revision No. are interchangeable whatever the manufacturing revision.

The modification of the technical revision breaks interchangeability. In exeptional cases, possible compatibility between two PWA's of different technical status is indicated, but this compatibility includes risk, which is specified in the Remarks column.

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PWAs INTERCHANGEABILITY TABLE

PART			CAN BE REPLACED WITH	REMARKS
REF.	No.			
ELGASE IV.2 50 sectors	47234696	011	ELGASE IV.3 N°47238264-XXX > 004 OR ELGASE IV.4 N°47238225-XXX > 003	must be used with PA.IV-1 N°47234666-002
ELGASE IV.2 42 sectors	47238279	011	ELGASE IV.3 N°47238278-XXX > 004 OR ELGASE IV.4 N°47238223-XXX > 003	must be used with PA.IV-1 N°47234666-002
ELGASE IV.3 50 sectors	47238264	004 005	ELGASE IV.4 N°47238225-XXX > 003	
ELGASE IV.3 42 sectors	47238278	004 005	ELGASE IV.4 N°47238223-XXX > 003	
ELGASE IV.4 50 sectors	47238225	003 004		
ELGASE IV.4 42 sectors	47238223	003 004		

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PWA'S INTERCHANGEABILITY TABLE (cont'd)

PART			CAN BE REPLACED WITH	REMARKS
REF.	No.			
PA IV.1	47234666	003	PA IV.1 N°47234666-002	
BCM 4	47231012			
BCM IV.1	47231017	103	BCM IV.1 N°47231017-003	
UD 169	47230174	005		
UD 169-1	47238807	001		

PWA'S INTERCHANGEABILITY TABLE (Cont'd)

PART			CAN BE REPLACED WITH	REMARKS
REF.	No.			
TERMINATOR	47234404	001	UD 200 N°47238803-002	
TERMINATOR UD 200	47238803	002		
V.C.B	47234763	101		